

**FACTORS INFLUENCING MARKET ACCESS AND LIVESTOCK MARKETING
INEFFICIENCY IN MPUMALANGA PROVINCE, SOUTH AFRICA**

By

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DEDICATION

The dissertation is dedicated to my darling husband, daughters, parents and siblings

DECLARATION

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Exact wording of the title of the dissertation or thesis as appearing on the copies submitted for examination:

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INEFFICIENCY IN MPUMALANGA PROVINCE

I declare that the above dissertation/thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



SIGNATURE

29/01/2018

DATE

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Abstract

Livestock production is the primary financial resource for most farmers in Mpumalanga province. Although commercial farmers require necessary equipment and technology to maximise their production and profit, but emerging small-scale farmers in the province face many challenges which have hindered their efforts to improve their livelihood, besides intervening in the procedure of commercialisation. Therefore, this study investigates the socioeconomic characteristics of the livestock farmers in the province, the determinants of market access and those influencing marketing inefficiency, with a view to developing policy recommendations.

Structured questionnaire was administered to 300 farmers in order to capture information on market access and factors that could influence marketing inefficiency. Descriptive statistics was utilised regarding basic characteristics of the households. A logit regression model was used to analyse market access (sale of livestock through formal markets) using STATA. Marketing inefficiency was computed as the reciprocal of marketing efficiency which was calculated using Shepherd formula, while the two stage Least Square regression was applied for factors influencing marketing inefficiency after identifying market access endogenous variable.

The study's extrapolations indicated that 7 variables were consequential at 1% and 5% significance level with market access, namely transport ownership, transport cost, market price information, advertisement, farmers' perception, marketing channel used and municipality. In addition, the results of the two stage least square model indicated that only 3 variables had remarkable significance with regard to marketing inefficiency. These are market access, livestock composition and infrastructure.

The findings of the study evidenced that to reduce marketing inefficiency, then it is paramount to enable the easy dissemination of information and improving infrastructure so as to give small-scale farmers easy access to the markets. Consequently, addressing marketing constraints will provide an insight that will allow development of strategies to deal with those problems correctly and more efficiently. The study recommended that focus should be centred on addressing the constraints existing in livestock marketing system to enhance access to markets by encouraging youth participation in agricultural activities and providing training programmes and easy access for marketing related information. Also, infrastructure deserves to be given more attention by renovating the marketing facilities especially road networks in rural areas. In addition, extension officers and veterinary services are to provide help and support in preventing infections and diseases in order to minimise the losses.

Keywords: Livestock marketing, Mpumalanga province, Marketing efficiency, Market access, Marketing strategy.

Word count: 378

List of abbreviations

- AGS** Agribusiness and Finance Group (FAO)
- DAFF** Department of Agriculture, Forestry and Fisheries
- FAO** Food and Agriculture Organisation of the United Nations
- FFS** Farmer Field School
- GAN** Global African Network
- IBI** Innovative Business Ideas
- NCSS** Statistical and Power Analysis Software
- NDA** National Development Agency
- NERPO** National Emergent Red Meat Producers Organisation
- NEPAD** New Partnership for Africa's Development
- NGO** Non Government Organisation
- PROLINNOVA SA** Promoting Local Innovation in Ecologically-oriented Agriculture and Natural Resource Management South Africa
- SA** South Africa
- SAGI** South African Government Information
- SF-FFS** Self-Financing Farmer Field Schools
- USAID** United States Agency for International Development

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the study

Promoting agriculture is vital for addressing the issues of poverty in rural areas, low employment rate, insufficient food and natural resources' sustainability (Shiimi, 2009). A finding that was very captivating is that the analyses of livestock sector policies are fully in agreement that animal products demand has a tendency to increase with the growth of the population, particularly with the urbanization that is rapidly growing (Kamuanga *et al.*, 2008; Upton and Otte 2004). The rise of demand for animal products maybe in line with the augmentation in the consumption of protein, specifically in countries that are developing, plus a bigger public health awareness in developed countries which lay a foundation to promote marketing opportunities (Horsthemke, 2009; Bahta and Bauer, 2007).

Intrinsically, marketing represents a key aspect in any system of livestock production because it provides a mechanism that allows the farmers to trade livestock and its products for money. Subsequently, they use this money to obtain the services and the goods that they do not produce themselves so as to fulfil their needs, such as food, clothing, education, medication and also to buy stock for breeding, in addition to other supplies and inputs needed for livestock production (Bekure *et al.*, 1982).

Basically, the production of livestock is a substantial agricultural enterprise in South Africa. For instance, almost eighty percent of South Africa's agricultural land is largely appropriated for farming extensively in livestock production; while other farming business equally combine livestock production. However, the livestock number varies in accordance with conditions of the climate; consequently, producers concentrate mostly on breeds that are developed, as they are more adapting to different weathers and environments. It has been noted that forty nine percent of agricultural outputs are contributed by this sector in South Africa. Up to eighty five percent of meat requirements are usually produced in South Africa,

while just fifteen percent are imported from Europe and other countries such as Botswana, Namibia, Swaziland, New Zealand and Australia (SAGI, 2010).

Mpumalanga plays a key role in South African's agriculture. It is one of the largest producers of fruits, vegetables and livestock in the country. Approximately fourteen percent of the land in Mpumalanga is naturally land for grazing. The products of livestock are mutton, wool, dairy, beef and poultry. Poultry and dairy perform effectively in the southern areas of the province. Many production companies of poultry own big facilities in the area of Standerton-Volksrust. One of South Africa's main sheep farming regions is the town of Ermilo, with the export of wool greatly benefiting the province and country. One of the country's biggest pig farms, Kanhym, is located in the province, near Middleburg. Another company, Karan Beef, own a large abattoir in Balfour to help in processing its immense feedlot in Gauteng. Nearly one thousand and eight hundred cattle heads can be processed daily there. Farming with goats is growing, particularly in traditional areas because goats are beneficial to rural people as they consume its meat and milk (GAN, 2009).

1.2 Problem Statement

Livestock production contributes towards an improved source of revenue for the farmers in Mpumalanga. According to Statistics South Africa (2016), 39.9% of the agricultural households are engaged in livestock farming while 22.2% are engaged in mixed farming (livestock and crop production). The number of agricultural households farming cattle decreased from 15552 in 2011 to 10422 in 2016, and sheep from 577 in 2011 to 357 in 2016.

A research on national strategy on education and training for agriculture and rural development carried out in Mpumalanga by Mahlangu and Sekgato (2002) mentioned that there are some farms, which have been abandoned because people who have been given the land are failing to make a living out of farming. The reason why they abandoned the land was because of internal conflicts, crimes, and lack of agricultural education on farming skills and applicable knowledge. This project identified the points of focus that any training programme for small farmers should concentrate on and these are marketing management and the issues

of production, while strategies for risk management and identifying marketing channels should be incorporated in marketing courses as training points.

Marketing of livestock is a complicated system because many factors intervene in the process of sale. Lack of infrastructure, transportation, funds and limited market information access lead to high marketing cost which reduces access to formal markets and limit the opportunities to develop a successful strategy. Numerous studies on the marketing of livestock in South Africa such as Bahta and Bauer (2007), Matungul *et al* (2001), Musemwa (2007) and Nkhori (2004) affirmed that low education, ignorance of training on management skills, lack of experience are the greatest constraints hindering effectual livestock commercialisation.

Factors influencing marketing of livestock include poor infrastructure, transport and related issues (Musemwa, 2007), market information access (Nkosi and Kirsten, 1993), and other factors such as household characteristics, training of farmers (Bahta and Bauer, 2007) and experience, herd size and support services (Nkhori, 2004; Coetzee *et al.*, 2004).

According to the study of Musemwa (2007), farming with Nguni cattle in Eastern Cape encounters problems related to transport, poor road networks and market availability. However, if the market is improved, available and accessible, the market would provide more competitive prices. Good price increases farmers' willingness to sell, which in turn will increase market participation. Withal, the study did not focus on marketing efficiency.

The findings of Bahta and Bauer's (2007) study showed that training level helps increase farmers' possibilities of selling livestock. Therefore, it was recommended that training programmes ought to incorporate the use of market information to enhance marketing decisions; however marketing efficiency was not included in the study.

Differently, Matungul *et al.*, (2001) reported that the heads of households with greater experience had at their disposal more personal contacts leading to business opportunities at competitive prices. Although Montshwe (2006) found that the size of the herd had a positive and significant association with selling probability in mainstream market; but the study however did not focus on the marketing aspect of livestock.

Thus, research on marketing constraints in the region of Mpumalanga are limited, and consequently have not been able to adequately proffer solutions that will stem ineffectiveness in marketing livestock products; hence, the necessity for this current research. Therefore, this study will focus on the identification of the determinants of market access and the factors influencing marketing inefficiency, in addition to providing improvement options to develop advising strategies for marketing of livestock.

1.3 Objectives of the study

-The study aims to identify the determinants of market access and the factors influencing livestock marketing inefficiency in the region of Mpumalanga, South Africa. The specific objectives are to:

- i. Identify the socioeconomic characteristics of the livestock farmers in the province.
- ii. Describe livestock farmers' current marketing strategies.
- iii. Analyse the determinants of market access.
- iv. Analyse the factors influencing marketing inefficiency.
- v. Use the finding from the study to develop policy recommendation.

1.4 Justification of the Study

The contribution of livestock products presents about forty percent of food value and agricultural production worldwide. However, public investments to facilitate livestock production are relatively too small (Fitzhugh, 1998). In developing countries, research, educational, extension, and veterinary, as well as the provision of specialised input are not completely privatised yet, and likely more time will pass before it would be.

Though it is patent that the demand for livestock products is growing rapidly and it is an exceptional opportunity enabling smallholder producers to benefit from the fast market growth (FAO, 2000), yet it is still obvious that the incorporation of small farmers into this growing profit-oriented enterprise will demand public effort in supporting farmers' organisations, at both the technical and commercialised levels. Hence, small farming

businesses cannot stay stable, considering the rapid growth rate for livestock produce; in fact, they are required to improve in managing their farms so as to reach notable commercialisation degree, which will in turn enable them to remain in the business (Pingali *et al.*, 2005).

Therefore, in recognition of the aforementioned, this study aims to identify the determinants of market access and the factors that influence marketing inefficiency, with a view to proposing improvements to the existing marketing system. Consequently, this will afford the farmers the opportunities to improve their livelihood. In the same vein, the conclusions and the recommendations of the study will be useful in the development of the techniques and needs that are bound to improve marketing efficiency in different regions in the country.

1.5 Outline of the study

This study contains six chapters. The first chapter is the introduction, and it explicates the background to the study, the problem statement, the objectives, hypothesis, justification and outline of the study. The second chapter discusses the theoretical framework and literature review; it provides research and facts related to marketing of livestock from other authors. The third chapter articulates the research methodology. Description of the study area is provided in this chapter, and also explains the sampling methods that were used, the methods that were employed in data collection and analyses. Chapter four presents a description of socio-economic characteristic of the respondent farmers as well as the existing marketing strategies. Chapter five describes the outcome of regression analyses and the discussion. Finally, Chapter six provides the summary of the study's findings and makes recommendations that will improve marketing efficiency.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

In South Africa livestock production is recognised as a vital sector for its contribution to the improvement of rural population livelihoods (Moerane, 2008). South Africa's political and economic history and present contributions vis-à-vis the poor and rural livelihoods are peculiar and unique. Unlike other nations under Africa, many people residing in rural areas in South Africa do not regard themselves as farmers in the first instance, and consequently, farming capacity has been severely depleted for a range of reasons. Moreover, more reliable, fashionable and attractive economic opportunities, mainly in urban areas, have further eroded farming as a livelihood strategy (Krone, 2006).

There are about fifty thousand commercial farmers that own livestock farms. Whereas some of them keep livestock as their principal business; others cultivate crops mainly and raise livestock as secondary. Eleven million cattle are owned by these commercial farmers, while five point sixty-nine million cattle are owned by two hundred and forty thousand small scale farmers and three million subsistence farmers. Concerning sheep farming, there are approximately eight thousand commercial sheep farms throughout of the country and about five thousand and eight hundred communal farmers (NDA, 2012).

In 2016, Statistics SA reported that there are 2.3m agricultural household in the country with less than a million engaged in livestock production. Until August 2016, the number of cattle in South Africa is estimated to be 13.4m, while sheep numbered 20.4m. As regards goat production, South Africa is a relatively small producing country; the total number is estimated to be 1.8m (DAFF, 2017).

2.2 Livestock Marketing System and Options

As stated by Emam (2002), marketing is a procedure that involves all the actions of selling the produce or the commodity, starting with moving it from the production area and ending at reach of the consumers. Abbott (1993) summarised the marketing tasks. He averred that the

tasks covered series of actions which include looking for buyers and all the operations involved before selling the product to the consumers such as storage, packaging, transportation and processing. These activities also included the provision and presentation of marketing finances and risk bearing for farmers.

Market access reflects an important part in providing greater income for livestock producers through various channels. According to Mbogoh (1993) in an article published by FAO, the farmers in Eastern and Southern Africa use two options to sell their livestock. These are informal and formal marketing systems. First assumption on economic performance of informal marketing systems measured by the criterion of marketing efficiency, suggested that a particular system functioned poorly. Therefore, it was recommended to increase government interventions in order to ameliorate the performance. However, those conclusions were greatly grounded on opinions circulating in traditional markets. In Sub Saharan Africa, other studies on livestock marketing system's performance gave inconsistent results. The findings of studies done in Ethiopia, West Africa and Madagascar evinced that the informal marketing system's performance was more satisfying than the performance of formal system.

2.2.1 Marketing Channels

Essentially, marketing channel begins with the farmers who produce live animal then many agents intervene to form the chain of sale process. Howbeit, the choice of the marketing channel depends on a number of issues, which include availability of markets, prices offered in the market, distance to the market and the potential of the market to absorb the stock on sale (Montshwe, 2006). In order to maximise the profit, different marketing channels are used: auction, speculators, butcheries, abattoirs and private sales. Each is taken in turn:

1. Auction

According to Nkosi and Kirsten (1993), livestock auctions are market places where producers bring their livestock to sell through public bidding to buyers who offer the highest price per animal. Those auction places are organised at regular times and are opened to all individuals; whether they are producers selling or buyers who could be another farmer, speculator, a butcher or anyone buying for personal use (NDA, 2005).

Livestock auctions are the most important marketing channel for livestock. However, low marketable numbers of livestock especially cattle present a big problem for auction agents in developing areas (Nkosi and Kirsten, 1993).

2. Speculators

Speculators often work in remote areas where institutional services are not available. They exchange services with the rural community by providing a marketing channel for rural farmers, and selling them some commodities and goods for their consumption (Montshwe, 2006).

According to Bailey *et al.* (1999), a cohort of competitive arbitrageurs is essential to efficient marketing arrangements. Nonetheless, small-scale farmers are of the opinion that speculators are exploitative in rural areas where infrastructure and institutions are lacking, cattle producers have to face only one monopolistic buyer, that is, the speculators, which has consequently resulted in exploitation.

3. Butcheries

Musemwa (2007) reported that farmers sell cattle to butcheries mainly because they offer essential marketing services to the producers, particularly to communal producers that are not able to sell and make a profit through alternative formal channels. The butchers can boost livestock saleability when buying for their use and when buying in auction markets. Nkhori (2004) submitted that the principal reasons certain producers are satisfied with selling to butcheries are the favourable prices they benefit, coupled with the fact that they can negotiate the price of their livestock.

4. Abattoirs

South Africa has approximately 495 abattoirs, while approximately 40% of all slaughtering are performed by abattoirs that may slaughter an unlimited number of animals (Class A), about 60% of the cattle are slaughtered by highly regulated abattoirs (Class A and B).

Most of these abattoirs have linkages with feedlots. Over the past ten years the number of cattle slaughtered has significantly increased by 15%, leading to 43% increase in beef production, which may be ascribed to increase in demand. For instance, Mpumalanga leads beef production with 23% in 2011, followed by Free State (NDA, 2012).

Largely, communal farmers do not use this channel to market their animals due to different reasons, such as the distance from the production area, delay of payments, the quality of animal and other extra charges, especially transportation cost that cannot be accounted for, in addition to the inconvenience of selling only one or two animals (NDA, 2005).

Likewise, abattoirs determine the price the animals are sold by considering the grade, the weight and age, and this system of grading undervalues compact breed, such as the Nguni cattle that does not take feeding practices into account. Nevertheless, they sell natural beef at high prices in local and international markets than genetically modified one. Consequentially, abattoirs make more money at the expense of the farmers. On the contrary, small-scale farmers have the ability to transform their cattle base into a capital base if they sell their production with the same prices offered in the markets, and this yield an improvement in their returns (Musemwa, 2007).

5. Private Sales

Private sales accounts for everyone who buys live animal for many reasons, such as household use, investments, religious festivities and socio-cultural functions (USAID, 2003). Communal farmers prefer this marketing channel because it allows them to decide the price for their stock and also, because it takes out the marketing costs. Therefore, private selling is inexpensive and is likely the simple structure of market place (Musemwa *et al.*, 2008). Private sales deals directly with consumers in the production area, give the biggest profit margin to the farmers due to the fact that brokers and middlemen's charges are removed (Nkhorh, 2004).

2.3 Determinants of Market Access

There is a general agreement that improving market access and marketing of livestock will engender the accrual of greater investment, which enhance productivity and income, and consequently will improve the livelihood of the farmers, especially in rural areas. Withal, both the upturn of market access and marketing of livestock are laden with several constraints, which have resulted into lack of progress. Some of these constraints and problems are highlighted below.

The first constraint that seems to be an obstacle to market access is infrastructure. There is no gainsaying that road infrastructures enhance livestock trading and reduce transaction costs for both the farmers and the buyers. However rural areas with impoverished road networks make transporters to increase the price of transportation of livestock to the markets, and this hike up impact negatively upon livestock commercialisation. Fundamentally, the infrastructure's shortcomings considerably hinder livestock flow to the markets (Mendelsohn, 2006).

Following this, it is highly necessary that market infrastructure should be improved by providing more and better markets, as well as making it easier for farmers to access them, which will ultimately lead to increase in the level of commercialisation, especially in developing countries (Shilpi and Umali-Deininger, 2008). On a similar note, Aklilu and Catley (2009) carried out a study on market access and trade issues affecting the dry land in the horn of Africa. The researchers avowed that market infrastructure, especially fenced-off auction yards with watering facilities, has been a foremost investment by donors and governments in the region, but its impact on livestock trade has often been minimal. Although, there are cases where improved market yards and loading facilities for animals sold at the market have proved to be beneficial, but this has not always been the case. A recent study shows that their benefit to traders and herders in terms of reduced transaction costs and higher sales volume and prices is limited, which means that careful analyses need to be conducted before investing in specific market infrastructure (Aklilu and Catley, 2009). Actually, in order to avoid paying high and extra fees those markets with new infrastructure

charge, the producers and the traders usually conduct their business transaction outside the new market places (Aklilu *et al.*, 2013).

Another challenge reducing market access is high transaction costs resulting specially from transportation of livestock to the markets. Musemwa *et al.* (2007) indicated that farmers' participation in different markets is slowed down by transactional costs. A particular channel will not be used by the farmers if its value exceeds the cost of employing it, which is a trait noted in majority of the cattle farmers in communal area. Equally, those in the remote location with networks of poor roads are in this category which results in farmers paying high transportation costs, and that often reduce the prices that the buyers were ready to offer them for their stock when buying on farm. Transactional costs are also influenced by the distance between the farms and the markets, because even though the farms are situated in location where good road networks are available, producers encounter high transportation costs as the distance to faraway market places is great (Nkhori, 2004). Furthermore, producers suffer other transportation charges when obtaining permits for animal transportation and sale from veterinary offices and police stations; and this is because the farmers are required to have transportation permits and identification certificates in order to be able to transport and sell their stock (NDA, 2005).

Other limitations to market access include poor condition of livestock and low marketable livestock number. Nkhori (2004) asserted that producers are discouraged to sell livestock which are in poor condition because they do not generate good prices in the auctions or in other market places. Analogously, animal's age is another contributory factor that attracts bad price when selling livestock, particularly if the animal is too old. Generally in rural areas, the numbers of livestock and their average weight are inferior to those found in locations characterised with commercial farm businesses (Stevens and Jabara, 1988). The World Bank (1998) has pointed out different restrictions that contribute to the decrease in productivity such as animals' poor quality and animal diseases, insufficient feed supplies, animal biodiversity and slow technology adoption. Musemwa (2007) divulged that livestock theft results also in lower marketable number; and moreover, poor condition of animals contributes to buyers failing to purchase livestock because of the high transaction costs.

Additionally, market information tends to influence market access. Fenyes and Groenewald (1985) posited that insufficient market information is common due to the large number of small producers, inefficient communication systems and low levels of literacy, as well as information administration. The provision of information to small-scale farmers is one way of maintaining transparency and inclusiveness, and according to Schubert (1993) this will make markets more accessible. In addition, Makhura (2001) argued that market information access was an influencing factor in determining market participation. The proximity to market information can influence production costs and a consequent augmentation of supply response (Mendelsohn, 2006). Small-scale producers will without a doubt gain from the available information on the existing market facilities, the demand for a particular product, the quantity and the quality, market opportunities and the prices (Frick and Groenewald, 1999). Leonard (2000) stated that smallholder farmers who don't have all the relevant information are not able to contract and enforce terms of exchange, which might result in them being exploited by well informed buyers.

Considering the situation in South Africa, the shortage of valid market information is critical since information on the official number, for example, of cattle slaughtered cannot be confirmed and this pictures a significant issue because prices are determined by the powers of supply and demand (Montshwe, 2006).

FAO and NEPAD (2002), mentioned in a report on improving infrastructure and trade related capacities for market access that African governments and their development partners have an important role to play in the area of market development, with three objectives in mind: speeding up the rate of market development; removing or reducing barriers to market access, both by special support in places where markets are slow to develop spontaneously and by easing market participation of poorer producers; and establishing a more equitable set of market relations between producers and markets intermediaries.

2.4 Marketing Efficiency

Marketing efficiency is the ratio of inputs to outputs. Marketing system efficiency is evaluated by the costs level to the system of inputs, to reach a particular standard and, or, quality of outputs. Such inputs are generally in the form of land, finance, time, manpower and materials. Typical outputs include the movement of a given amount of product to markets at specific distances, the supply of a particular level of service to target market segments and the supply of products at a target price. Hence resources are the costs and utilities are the benefits that comprise the marketing efficiency ratio. Effective marketing efficiency maximises the ratio of inputs to outputs and a high efficiency benefits the whole society including producers, traders, wholesalers and consumers (FAO, 1997).

Ajala and Adesehinwa (2007) recorded a change in theoretical and applied models used in market analysis. These models include: Structure, conduct and performance (SCP), commodity approach and transaction cost economics (TCE). They attributed the wide array of models to inadequacy of any single model to study markets in the developing countries. Therefore, they recommended a blend of the models for complementary purposes and depending on the nature of the problem under study (Okewu and Iheanacho, 2015).

A progress in the theory of marketing efficiency caused the emergence of a minimum of two hypotheses (Seanicaa *et al.*, 2006). The two hypotheses are the structure performance hypothesis (SPH) and efficient structure hypothesis (ESH). The SPH proposes that markets with high concentration have a poor performance. On the other hand, the ESH proposes that performance is related to the market shares, which raises the profits. Examples of studies that confirmed the SPH are Bett *et al.* (2012), Afolabi (2007) and Olufemi and Adeolu (2010), while those that confirmed the ESH included Emam (2011), Massoud and Srinivasa (2012), Farayola *et al.* (2013) and Dastagiri *et al.* (2013).

The figure below shows that the elements of Market Structure comprise: the barriers to entry and exit into the market, and marketing channels; Conduct incorporates: pricing strategies and promotion strategies; conversely, Performance entails: marketing costs, marketing margins and profits (Greer, 1992). These elements of the markets were assumed to have a sequential

relationship (Ferguson and Ferguson, 1994). On the other hand, the socioeconomic characteristics of the traders were conceptualised to have an effect on the marketing efficiency (Dastagiri *et al.*, 2013; Farayola *et al.*, 2013).

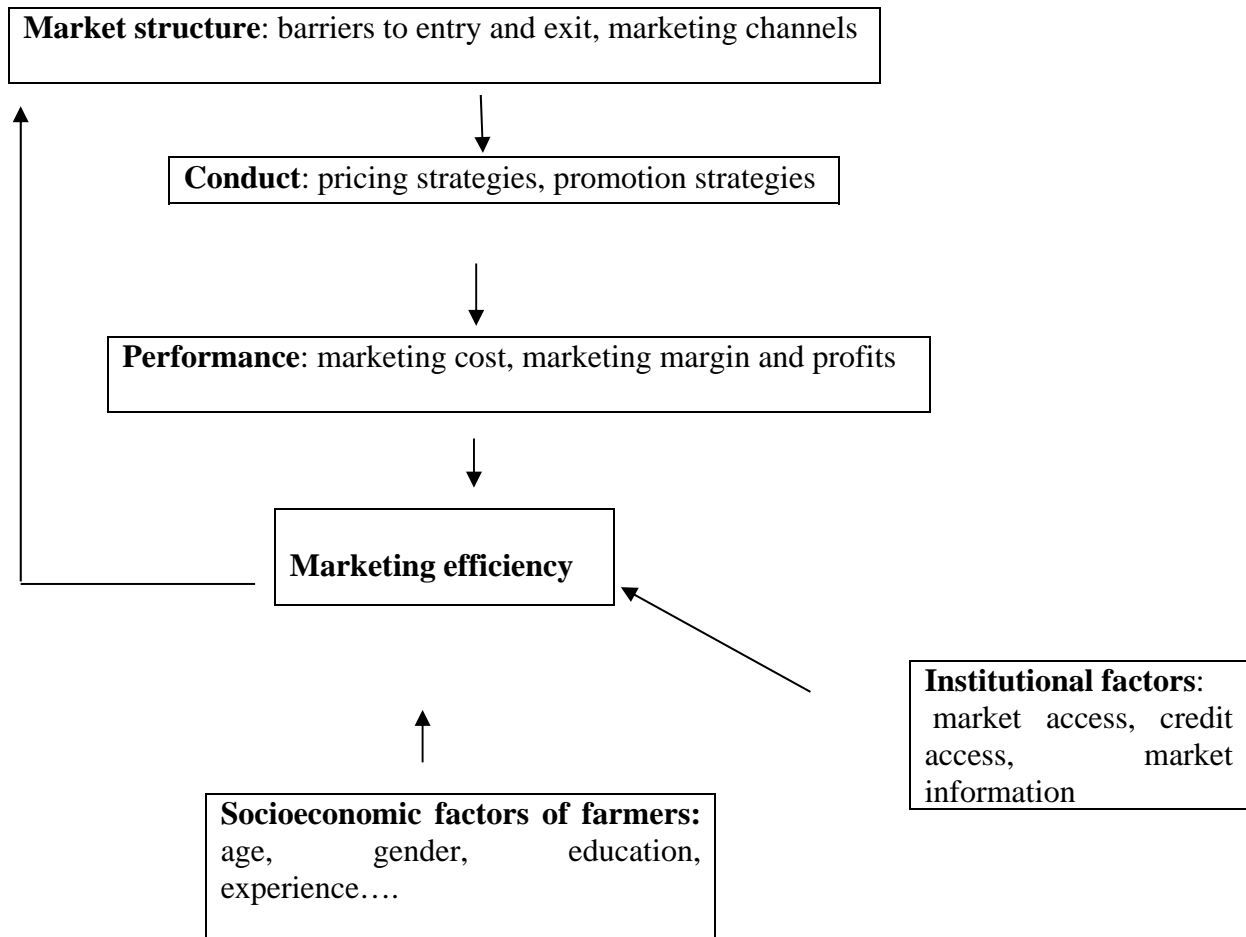


Figure 2.1: Conceptual framework modified from Lutz (1994)

There are two aspects of market efficiency mostly mentioned in agricultural marketing literatures, and these are technical efficiency and pricing efficiency (Meshack, 2015).

Technical efficiency (TE) is attained when goods and services are provided at a minimum average cost, that is, when the least cost combination of marketing activities is employed (Effiong and Onyenweaku, 2006). Technical efficiency is achieved through technical improvement. Pricing efficiency (PE) is concerned with the price-making role of the market

system. It concerns how accurate, how effective, how rapidly, and how freely the marketing system makes price, which measure product values to the ultimate consumer and reflects these values through the various stages of the marketing system to the producer (Andargachew, 1990).

Olukosi and Isitor (2004) noted that efficiency is the most frequently used criterion to measure market performance in agricultural industry. Correspondingly, marketing efficiency is a common objective of farmers, food marketing firms, consumers and the society at large. Given this, the thrust of this present study is how to evaluate marketing efficiency of livestock in Mpumalanga province and what are the determinants of marketing inefficiency; hence the motivation to estimate these factors and their influence on marketing inefficiency.

2.5 Determinants of Marketing Inefficiency

Marketing inefficiency is caused by factors acting as constraints and barriers to achieving the desirable profit by farmers. In developing countries, most of the livestock produced by smallholder pastoralists and farmers are marketed by private entrepreneurs who, operate as a marketing chain collect, regroup and distribute the livestock and livestock products to terminal markets. Although the marketing chain is well known, the economic and institutional barriers to livestock marketing (transportation costs, quality standards, inadequate and uncoordinated livestock market information system) limit livestock sector development, with a consequent negative impact on the welfare of the large population of smallholder producers and others who depend on the sector for their livelihoods (Rota and Sperandini, 2010).

In South Africa, Montshwe (2006) and Musemwa *et al.*, (2007) and Moloji (2008) have studied marketing constraints of livestock and the factors influencing farmers marketing behaviour, they found that the major constraints are related to socio-economic factors.

2.5.1 Age

According to Dlova, Fraser and Belete (2004), cited in Machingura's (2007) study, farmers' age is considered an influencing factor in determining whether the farmer is successful or not.

The researchers took cognisance of the fact that older producers are not able to handle the heavy work required in farming practices unlike their younger counterparts. Furthermore, the study postulated that young producers are more likely to take on new technology than old farmers, since old people have no interest in trying new methods. Age may also reflect increased trust and reputation (credibility within the networks) obtained by always doing business with the same individual (Matungul *et al.*, 2001).

2.5.2 Experience

Experience which comes with age usually is assumed to be an influencing factor. Nkhori (2004) argued that, age is an important factor because it helps in determining if households benefit from the experience of older farmers or must make decision on the basis of risk-taking attitude of young producers. The heads of households with greater experience had at their disposal more personal contacts leading to business opportunities at competitive prices. Shiimi (2009) added that the longer a cattle producer is engaged in agricultural activities, the more marketing experience he gains. This gives the producer adequate time to compare different marketing channels and establish a good bond with the channel that offers him the best price.

2.5.3 Gender

Machingura (2007), citing Bembridge (1984), stated that profiling best farmers' characteristics showed that the households managed by men were more successful. The findings maintained a match with Dlova *et al.*'s (2004) research who affirmed that it was expected because males are physically capable of coping with the manual demands of farming practices.

Chawatama *et al.* (2005) worked on socioeconomic status of smallholder livestock production in Zimbabwe. Subsequently, the examination revealed that women are still disadvantaged socially and economically. It was discovered that the majority of women (60 %) admitted that they did not own large animal species like cattle because they lacked capital to purchase them.

Furthermore, there was consensus among women that the reason they could not buy livestock was that men controlled all cash obtained from crop production

Females in the households are also required to do the housework. The married women were excluded from making decisions regarding the farm activities notwithstanding the fact that their husbands were not farmers, and this had an effect on women's ability to succeed (Dlova *et al.*, 2004).

2.5.4 Education Level and Training

According to Dlova *et al* (2004) the farmers that were successful were those with higher educational level. Evidently, this is a token that natural skills can be enhanced by a good background of education; for it is palpable that education functions as a base for making well-informed decisions. Entrepreneurial success requires formalised knowledge of functional aspects like marketing, purchasing, supply chain management and finance (Rwigema and Venter, 2004). Hence, education boosts the management potential of farmers when making plans and executing them, as well as obtaining information to ameliorate marketing abilities.

However, Nompozolo (2000) suggested that education and training should go hand in hand, education being the primary motivator and initiator. Doni (1997) emphasised that every initiative in agriculture development should begin by training the particular farmers prior to providing other support services. A specific training has to be continued by the extension services as a component of the training programme execution.

In the same vein, a research carried out by Bahta and Bauer (2007) verified that the level of training increased the probability of farmers selling livestock. Thus, all programmes for agricultural training have to include how to use market information in order to enhance decision-making concerning marketing issues. Training, however, goes beyond the issue of marketing, and issues related to production techniques need to be addressed urgently. Congruently, educational institutes can play a great role in improving the level of training of small-scale farmers.

2.5.5 Other Socioeconomic Factors

a. Herd Size and Quality of Animal

Number and quality of animals play very important roles in marketing of livestock. Montshwe (2006) divulged that the size of the herd significantly and positively influenced the participation of farmers in the mainstream markets, which means that an increase in livestock herd size will increase the sale.

In addition, livestock's poor condition is very critical because it results in poor prices; equivalently, animals' age is also crucial because it contributes to low prices too. The cause of animal's poor condition is a result of natural resources utmost degradation, insufficient grazing, and shortage in supplying the necessary agricultural materials including feed supplements and vaccines, coupled with the issue of breed inferiority. These, tend to reduce more the livestock value in the markets.

b. Infrastructure

Marketing infrastructure shortages cause big limitation for livestock commercialisation (Mahabile *et al.*, 2002). For example, majority of the farmers that benefited from Nguni cattle programme in the province of Eastern Cape are situated in remote areas far away from main market places and the infrastructure facilities are seriously insufficient (NDA, 2005); which gives explanation to why the supplies of livestock by small-scale producers to formal market places are very low (USAID, 2003). According to Frisch (1999), marketing facilities that exist in some communities are not working or in bad conditions, and that is because producers do not have sufficient or large amount of money for maintaining them. Holding facilities and transportation are the major physical infrastructure weakness for the Nguni cattle farmers in communal areas (Bailey *et al.*, 1999). Lack of marketing facilities such as loading ramps and selling pens are some of the many factors imposing serious constraints on the ability of small-scale producers to market their cattle in South Africa (NERPO, 2004).

In order to improve the infrastructure, producers, community members and government need to join their efforts to construct and maintain the infrastructure in communities; by doing so,

the members of the communities may have some ownership sense and feel responsible which allow them to help in maintaining the infrastructure. Efficient marketing infrastructures such as wholesale, retail and assembly markets, and storage facilities are essential for cost-effective marketing, to minimise post-harvest losses and to reduce health risks. Markets play important roles in rural development, income generation, food security, developing rural-market linkages and gender issues (Marocchino, 2009).

c. Access to Loans and Credits

The basic cause of development in some countries such as United Kingdom, United State of America, Canada, Germany and France is extensive use of credit. Eastern economies also favour the extensive use of this instrument for increasing output which boost standard of living of farmers and economic growth (Sarwar, 2011).

Though a common problem exist for small producers usually faced with many challenges when trying to obtain grants or loans to maintain their small farms or in order to grow the businesses. Nevertheless, Federal government helps these farmers in numerous ways to solve this common issue. The solution to this problem of fund shortages is that the government should intervene and give loans and grants to small-scale farmers. There are many kinds of grants given to small farmers, and the only thing that the farmer can do is to know the different types and be well informed about these grants that are available for them (IBI, 2011). A project by PROLINNOVA SA (2006) found that a lot of experiences in introducing Innovation Support Funds (ISF) for small farmers in Okhahlamba district, Kwazulu-Nata depend on outside contribution of government, non government organisations and donation from institutions that focuses on research studies. Those fund contributors do not only work according to plans, but their work is also seasonal, and on account of this, they undergo a shift from the point of focus, which place long term vision initiative at risk. Patently, the plans of funding that mainly rely on outside money injection will too encounter serious challenges when attempting to expand the location of fund coverage.

Another case of funding facility is the self financing farmer field schools implemented in Kenya; it is a loan facility that provides loans to the self-financing farmers field schools that applied for one (Khisra, 2003). The benefits of this facility are that the farmer field schools take all the responsibilities and execute the process. Although, farmers field schools is not really self-financing because they depend on outside loans or grants; actually, but they are groups that manage their finances and after selling the products, they repay the money that they obtained from the fund. However, self-supporting cases exist as a result of generating cash from selling products from the farmer field schools.

In contrast, the cases of generating funds by some community members are unusual in South Africa. Equally, the track record of the management of loan funds and the repayment of loans are also generally very poor; except for savings clubs, also referred to as stokvel, a term used largely in South Africa for group community based savings club, and this is common in South Africa and also in other developing countries. The reason however, for a particular savings is not usually for the group's benefits; rather it is for the household's use, while exceptions do exist. Numerous agencies, private and public are put established in order to provide a helping hand for small producers, attempting to aid their survival. In view of this, many plans and projects were made by those agencies, so as to focus mainly on the help rendered to small-scale farmers by giving grants to them (IBI, 2011). Proportionally, facilities and credit for small-scale producers should be emphasised, rather than major investments in institutions and facilities (such as big abattoirs, dairy plants and feed mills) which are usually oversized, overstaffed and over equipped (FAO, 1995).

Similarly, Land Bank is a specialist agricultural bank guided by a government mandate to provide financial services to the commercial farming sector and to agri-business. This bank has successfully reached many small producers by granting loans to these particular farmers but most of them have no land. The realisation of inadequate progress that was found regarding the improvement of access to credits by smallholder producers has encouraged the government to provide the agricultural credit scheme that was aiming to address the needs for credits by small farmers. The difficulty is in achieving the goal of ameliorating credit access for smallholder producers and in securing the scheme sustainability (Machethe, 2005).

d. Transportation of Animals

It is a palpable fact that transportation infrastructure is a necessity as transport is an essential element of functioning in livestock enterprise. The issue of transportation, with its related ancillary is a contributory factor to the efficiency or otherwise of livestock production. Subsequently, the economic status of these farmers is crucial, considering the costs of transportation of livestock. The direct costs consist of the charges of animal shipment which include loading size, distance to the market outlets, and the manual difficulty to reach the delivery destination or the pickup points, together with all other particular handlings when they are needed. It may be required to take into consideration other charges; for example, specific insurance requirements and death losses. The indirect costs may result in different elements contributing to the expenses registered during the transportation of livestock to market places (Speer *et al.*, 2001).

Apparently, farmers, especially in rural areas are facing many problems regarding the transport system of their livestock products, and those problems are markedly linked to numerous factors which are cited in a study by Nkhori (2004). Factors such as poor roads (or inadequate road network) make it costly for producers to get to sources of information or to take their products to the market. The fees of moving livestock from the farms to the markets are increased by the transporters when road conditions are bad as a compensation for the damages that their vehicles suffered while using these roads. As such, it follows that if the buyers come to the production site using such roads, the price that they are ready to offer the producers is reduced.

Asides of long distance from formal markets places, road networks and bad conditions in remote location of communal areas in South Africa, present a serious limitation. As a result of this, the ability of producers to attract traders in those areas is influenced by the high costs of transportation that are linked to the poor state of the roads (NERPO, 2004).

Accordingly, transportation costs, and related issues of time required to transport products to marketing centres imply that the ability of smallholders to access market outlets is inevitably limited. The greater the distance from market or service centre the larger the transaction costs

which automatically become prohibitive mostly to smallholders than large-scale producers /sellers (Nkhori, 2004).

e. Market Information Access

It cannot be gainsaid that information plays an important part in ameliorating the conditions of living for farming households; it profitably helps to improve the livelihood of small farmers and boost development in rural areas. The role of information in improving and shaping decision-making has been extensively researched. The managers of the farms or the enterprise need information on daily basis for market supply and demand, inputs and production, regulations and government policies, new technologies and development projects, local councils decisions and additional subjects, for example, education and well-being. Extensive and good information always tend to help communities enforce the services that are locally provided, besides expanding the social capital. Therefore, it is necessary for farmers to have access to timely and valid information regarding the prices of their goods to enable them to make accurate decisions in the short-term, on their inputs purchased and products sold. Shepherd argued that, in developing countries information about prices offered in markets and trading numbers with additional marketing related issues do not often reach numerous farmers (Dixon *et al.*, 2005).

Demonstrably, farming business in the United Kingdom appeared not to be connected to the other economy sectors. Following this, it is advised that small farm entrepreneurs should form a partnership in order for them to function as one enterprise, which consequentially will enable them to enjoy the benefits that big farming businesses have (Gonzalez-Diaz *et al.*, 2007).

Comparably, the South African situation follows the same pattern as in the United Kingdom. Farmers are detached from their markets as a result of market deregulation, which lowers their profits as market concentration increases at the processing and retailing levels (Botha and Van Schalkwyk, 2006), thereby reducing their market power. In addition, they are facing increasing levels of poverty, food insecurity and weaknesses in the restitution, redistribution and tenure programmes, making it difficult for emerging farmers, who produce in small volumes, to gain access to the markets.

2.6 Analysis of the Information by Farmers and Making Decisions

The analysis of the agricultural information system in a specific farming system may provide the identification of basic components and structure of the system; the different sources of information used by different components in the system; the understanding of how successfully the system works and how to improve system performance (system management) (Demiryurek, 2000).

If farmers are to effectively use market information, then they need to be able to fully understand it; for example, they need to understand the qualities to which quoted prices refer and the transportation costs when moving their products from the production area into the targeted markets. Regarding this point, it is necessary for extension officers to have enough knowledge which will enable them to give the farmers the right advices (AGS, undated).

The quality of the decision made by household depends on their information base about the price offered by marketing channels. Information tends to improve decision-making skills. For example, beef producers are presumed first to decide on the prices they are expecting to get, before taking any decision on selling the products and choosing a buyer to sell to. The search costs for information about market prices rely on the degree of availability of the information. The more information farmers have about marketing channels, the lower the transactional costs would be (Nkhori, 2004).

2.7 Improvement of Market Information Access

FAO has conducted a study in Uganda, Eritrea and Ghana, on farm households' local features, and the sources of community information and its circulations. The focus of the study was the possibilities to enhance the flows of information by using technology, institutes, and techniques which help reduce information costs such as collecting, organising and distributing. Specifically, communication centres for example, radio FMs, provide potentials as tools connecting people with access to computers and internet and those who do not; and stimulate amelioration in local information distribution and link communities to outside sources of information. The study concluded that that the lessons learned are mainly three: the awareness provided on farmers' behaviour looking for information, the information

network limitations and the pointed out possibilities to improve the distribution of information to communities in rural areas. (AGS, 2005)

According to Dixon *et al.* (2005), the identification and motivation of crucial information suppliers are very important in communal areas, in order to get the agricultural information to other producers. The contributors of crucial information probably exist among producers that have the capacity to spread information to other farmers. Producers that have low information access particularly in areas with limited services need to be motivated to connect better with the others and with the heads of their communities to increase their information access. It is important to create a system based on the information gathered from the farmers, to make certain that feedbacks are handed to them and this would require the involvement of government, non government organisations and researchers. Feedback provision would enhance the confidence of the farmers and their interests to develop programmes and research; also it would inspire new understandings for the relation amongst farmers and the agents of support services. Documented information, which is in insufficient supply currently, is required to be directly available for farmers, and also for stockholders, enabling them to supply suitable information for farming households. Extension officers need to be informed about new technologies and different farming activities to improve the extension service they provide and that will tend to enhance the management of farm practices.

2.8 Conclusion

The strategies of governments for integrating sustainable rural development have recognised farming with livestock to be the agricultural business that has more chances to help improve food security and reduce poverty (Moloi, 2008). So, every research related to livestock marketing is important in providing implication for farmers, government and policymakers with the necessary conclusions and recommendations allowing them to plan improvements for this sector.

The above literatures in marketing of livestock and the factors influencing every one of its aspects show the existed initiatives that took place in order to identify the problems and the challenges faced by the farmers and to reveal the opportunities to improve marketing of

livestock. Therefore, this part of reviewed literatures aligns with the general introduction clarified in chapter one of this study, and also, to provide needed understandings that chart the research and its motivation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three elucidates the study area, explains the methods used for sampling procedure and collection of data. This chapter also expounds on the method utilised for the data analyses.

3.2 Description of the Area of the Study

The province of Mpumalanga was the area where this study was conducted. As stated by the South African geographical database, the Mpumalanga province is the second smallest province after Gauteng with 4.3 million people by mid 2016 and 76495 square kilometres, which represent 6.3% of land in South Africa. Mpumalanga is divided into three districts municipalities: Gert Sibande, Nkangala and Ehlanzeni.

Mpumalanga remains amongst the largest production region for agriculture. It is one of the largest producers of fruits, vegetables and livestock in the country. An approximate of 14 % of the land in Mpumalanga is an area for natural grazing. A variety of livestock product items are processed in the province such as dairy, beef, poultry, wool and mutton. The province's southern area is where poultry and dairy are largely produced. In the area of Standerton-Volksrust, many companies for poultry production are established and which own big facilities for processing. One of South Africa's main sheep farming regions is the town of Ermilo, with the export of wool greatly benefiting the province and country. Also, one of the country's biggest pig farms, Kanhym, is situated in the province, near Middleburg. Another company that deserves to be mentioned is Karan Beef; it owns a large abattoir in Balfour to help in processing its immense feedlot in Gauteng. Nearly 1800 cattle heads can be processed daily there. Farming with goats is growing, particularly in traditional areas because goats are beneficial for rural people as they consume its meat and milk (GAN, 2009). Until March 2016, livestock numbers in Mpumalanga are estimated to be 1.5 million cattle, 945 thousand sheep and 337 thousand goats (StatsSA, 2016).

3.3 Sampling Procedure

Selecting farmers to participate in this study was founded on the fact that they own livestock and they were willing to take part in it. The farmers have been informed on the study's objectives and also of confidentiality. They were asked to sign a consent form. Farmers were interviewed individually. Interviews were held at farmers' homesteads or at their business areas and also at meetings organised by the extension officers, with appointments made in advance.

3.4 Data Collection

A constructed questionnaire was employed to collect primary data. It is designed to acquire a range of information on:

- Household's head characteristics (age, gender, experience and level of education),
- Farm characteristics and managements regarding employees, livestock production and sale,
- Marketing related issues (marketing channels, use of funds, market information access and transportation).

English was the language used to write the questionnaire, and the extension officers helped with the respondents that do not speak English by translating the questions into their native language. The answers were written down in the questionnaires, and then transferred into computer for further analyses.

3.5 Data Analyses

3.5.1 Descriptive analysis

The descriptive statistics that were applied for the sampled households' basic characteristics includes percentage, tabulation and graphs.

3.5.2 Determinants of market access

In order to analyse the determinant of the formal market access, a logit model was applied for factors that were assumed to affect it because a logistic regression is a technique capable of explaining a dichotomous variable and according to Molla-Bauza *et al.* (2005), it is a multivariate technique used to study relationships between dichotomous dependent variable and one or more independent variables.

The logistic regression is widely used in economic research for two important reasons. One is that the function is simple to use and greatly flexible. The second reason is that the result's interpretation is meaningful and not complicated (Kleinbaum, 1994).

The logit model function, as expatiated by Gujarati (1995) is according to the following form:

$$P_i = E(Y=1/X_i) = 1 / (1 + e^{-(\beta_0 + \beta_1 X_i)}) \quad (1)$$

Equation (1) could be written

$$P_i = 1 / (1 + e^{-Z_i}) \quad (2)$$

A probability for a particular household had sold livestock through formal market is expressed by (2) while, the probability for household that sold trough informal market is given by:

$$1 - P_i = 1 / (1 + e^{Z_i}) \quad (3)$$

So, equation (3) could be written as

$$P_i / (1 - P_i) = 1 + e^{Z_i} / 1 + e^{-Z_i} \quad (4)$$

$(P_i / (1 - P_i))$ is the odds ratio in favor of a household being sold through formal market.

Introducing the natural logarithms to equation (4), we obtained:

$$L_i = \ln(P_i / (1 - P_i)) = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (5)$$

Where P_i is probability of selling through formal market and varies between 0 and 1. Z_i is the function of n explanatory variables (X_i):

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (6)$$

Where β_0 is intercept, $\beta_1, \beta_2, \dots, \beta_n$ are the slope parameters in the model.

L_i is the log of the odds ratio and X_i is the vector of the relevant sampled household's characteristics.

If the disturbances term (U_i) is introduced to the logit model it becomes:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + U_i \quad (7)$$

Equation (7) is estimated by the method of maximum likelihood and the estimated parameters are obtained using STATA.

The independent variables included in this study and their expected signs are presented in appendix 3.

3.5.3 Marketing efficiency

To calculate marketing efficiency for each marketing channel used by the farmers, Shepherd's formula was used as follows:

ME = V/I where

ME is marketing efficiency.

V: is value of goods sold (Value of animal sold).

I: is total marketing cost.

Marketing cost includes transportation cost (truck rental), loading, unloading animals, advertisement cost, middleman, and other fees (market fees).

Marketing inefficiency was computed as the reciprocal of marketing efficiency using Microsoft Excel, then, data was imported into STATA and because endogenous variable was identified; the two stage least square regression 2SLS was applied for factors that were assumed to influence marketing inefficiency.

According to Statistical and Power Analysis Software NCSS (online), the two stage least square (2SLS) includes four types of variables: dependent, exogenous, endogenous and instrument. These are defined as follow:

Dependent variable

It is the response variable (Y) and it is to be regressed on the endogenous and exogenous variables but not on the instruments.

Exogenous variables

These are the independent variables (X_{ex}) that are included in the first and the second stage regression models. They are not correlated with the random errors values in the second stage regression.

Endogenous variables

Each endogenous variable (V_{en}) becomes the dependent variable in the first stage regression equation. Each is regressed on all exogenous and instrument variables. The predicted values from these regressions replace the original values of the endogenous variables in the second stage regression model.

Instrumental variables

In the first stage regression equation, the endogenous variable becomes the dependent variable and it is regressed on all exogenous and instrument variables (X_{iv}). The predicted values from these regressions replace the original values of the endogenous variables in the second stage regression model.

The 2SLS model is comprised of the following two linear regression models.

$$y = X_{ex} \beta_{ex} + V_{en} \beta_{en} + e$$

$$V_{en} = X_{ex} \Gamma_{ex} + X_{iv} \Gamma_{iv} + E = Z \Gamma + E$$

The study identified sixteen independent variables that were measured as continuous and discrete. Continuous variables capture any numeric value whereas discrete variables register only two values, one or zero. Table 3.1 below presents the variable used in the analysis.

Table3.1: Explanatory variables that were used in marketing inefficiency analysis

Variables description	Variables name	Measurement value	Sign expected
Farmer's Age	age	In years (number)	-
Farmer's gender	gender	1 for male and 0 otherwise	+
Education1	education1	1if farmer has primary education, 0 otherwise	-
Education2	education2	1if farmer has secondary education,0 other wise	-
Formal Employment	employment	1if formally employed, 0 otherwise	+
Experience	experience	In years(number)	-
Agricultural training	training	1 = have training, 0 otherwise	-
Organisation membership	organisation	1if farmer is a member of agricultural organisation, 0 otherwise	-
Livestock composition	livstockcom	1if only keeping cattle, 0 otherwise	-
Herd size of cattle	herdsizeca	Number of cattle owned	-
Infrastructure	infrastruc	1if infrastructure (roads, holding facilities) is good and 0 otherwise.	-
Crop cultivation	crop	1= cultivate a crop, 0otherwise	+
Credit access	credit	1=have access to credit, 0 otherwise	-
Transport ownership	transport	1=farmer owns truck (transport owned), 0 otherwise	-
Use of broker or agency to sell	brok	1 if used , 0 otherwise	+
Market access	marketaccess	1=formal market used to sell, 0 otherwise	+/-

3.6 Limitations of the Study

It was very hard to find farmers that were willing to take part in the study and some of them were hesitant when it came to giving personnel information like their income and their livestock numbers. Most of the respondents did not have documentation for record keeping and so it was not easy to remember, therefore the information obtained was founded on their pre-existing experiences. In overcoming these limitations, some additional time was spent looking for respondents that were willing and ready to take part in this research.

CHAPTER FOUR

SOCIO-ECONOMIC CHARACTERISTIC OF THE FARMERS

4.1 Introduction

The socioeconomic characteristics of the respondent farmers are described in this chapter. The main objective is to highlight the current characteristics of the farmers in the study area which are demographic characteristics, herd composition and size, and farm characteristics. It also, provides a clear view of the marketing strategies used by the respondent farmers.

4.2 Household Characteristics

4.2.1 Age of the Household Heads

The involvement of young people in agricultural activities is very important because the future of agriculture production is in their hands (Musemwa, 2007).

In this study, only 16.7% of the farmers interviewed were forty years old or younger and 40% were above sixty years old. Most of the participant farmers were between the age of forty-one years old and sixty years old (43%) and this can be seen in Figure 4.1. Older farmers reflect high trust and reputation which means they have more credibility gained by being in farming activities longer leading to business opportunities at competitive prices.

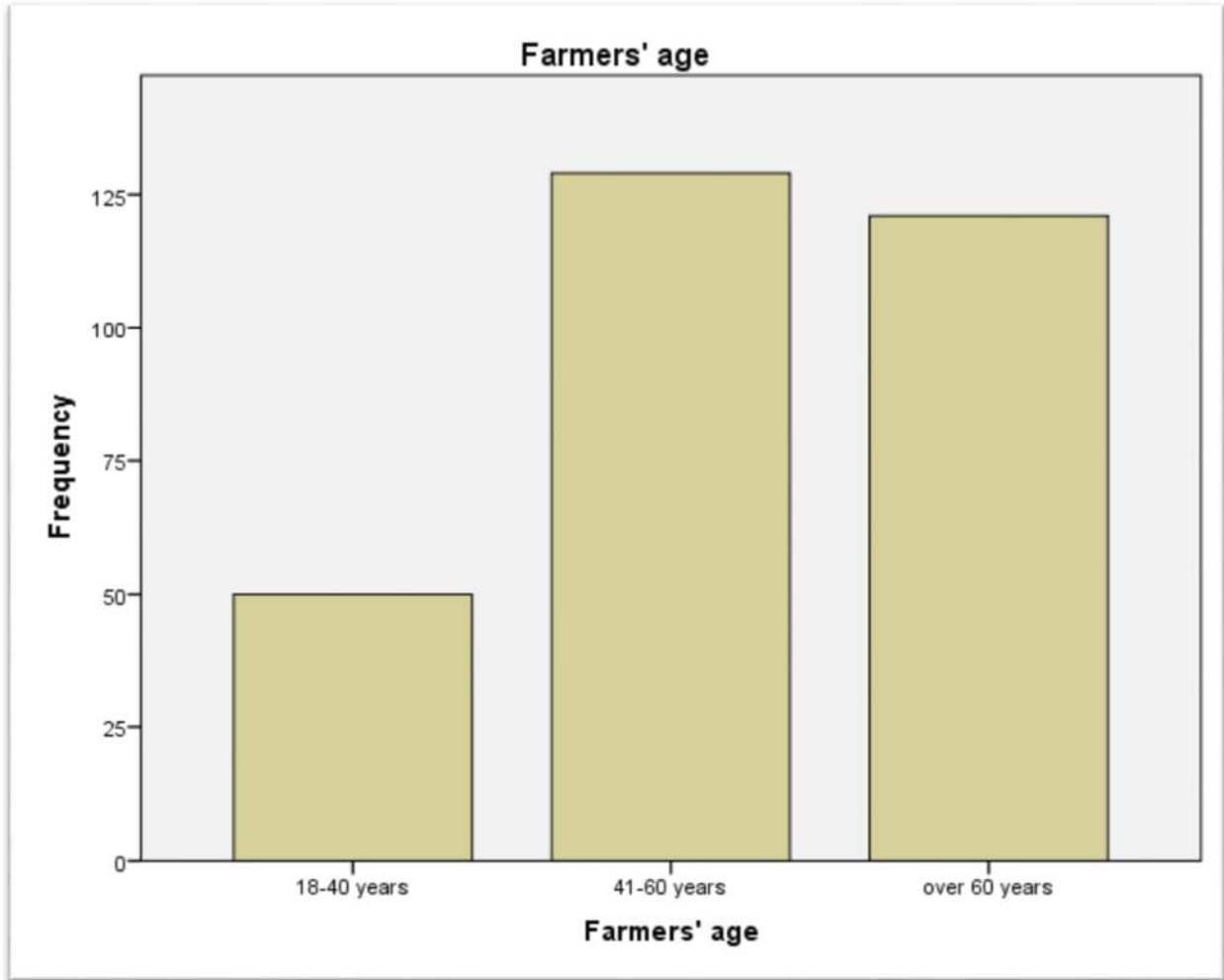


Figure 4.1: Age of the farmers

4.2.2 Gender of the Household Heads

The highest percentage of the farmers interviewed was male (76.7%). The remaining 23.7% were female farmers as shown in Figure 4.2. This clearly shows that the male domination in agricultural activities is still very common and also, indicates that female farmers are still disadvantaged socially and economically because male largely controls the farming business and the markets. This result tallied with the findings of previous studies, such as Nkhori (2004), and Musemwa (2007).

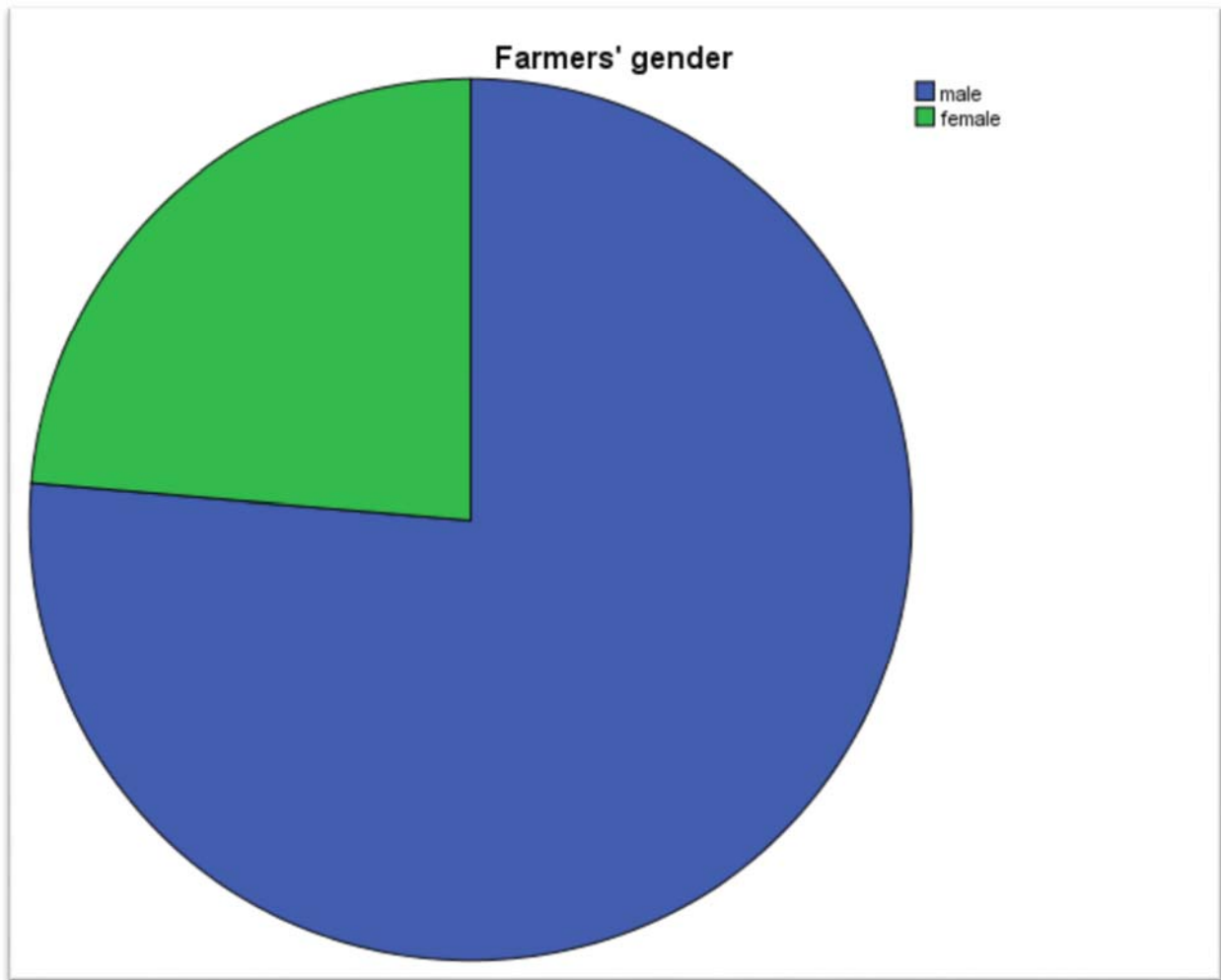


Figure 4.2: Gender of the farmers

4.2.3 Marital Status of the Household Heads

Seventy one percent of the respondent household heads were married, while 16.3% were single. Only, 4.3% were divorced and 8.3% were widowed as shown in Figure 4.3. This result maintained a parallel with a study done by Machingura (2007), where most of the farmers were married. The married household heads have at their disposal a free helping hand in managing the farm and also a source of labour if need. In fact, some household maintain their livelihood by having a spouse working away from home, and a wife taking charge of the farm.

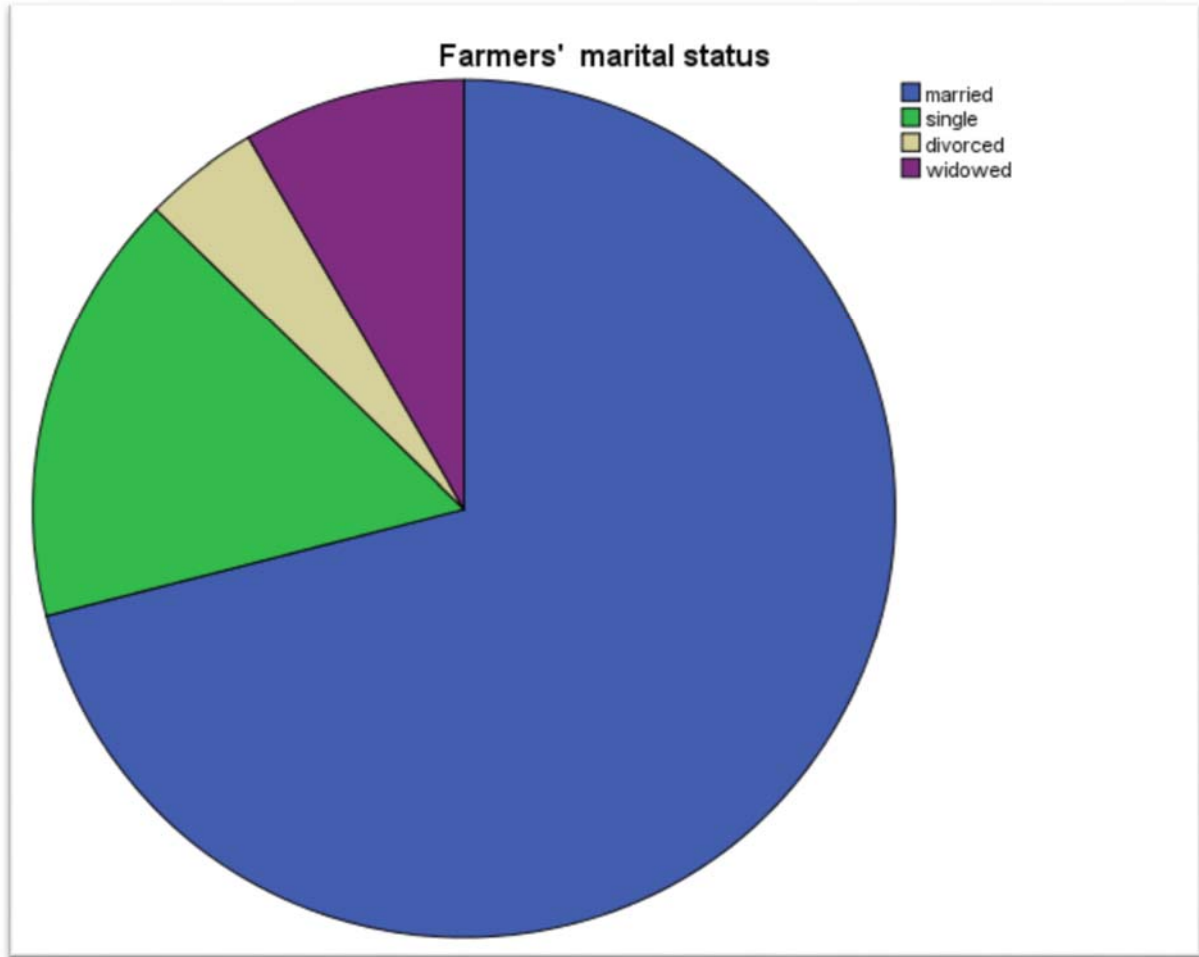


Figure 4.3: Marital status of farmers.

4.2.4 The Level of Education of the Participant Farmers

Farmer's educational level is very crucial, it allows the farmers to read, understand and interpret market information. Nkhori (2004) stated that education also helps in improving farmer's capacity in managing their resources more effectively. The table below shows that 51% of the interviewed farmers have primary education level, 31% have secondary education and only 18% have university education. This indicates that the majority of the farmers have at least primary education and the problem of farmers have never attended school have diminished significantly. The existing young household heads have had considerable basic education and understandings of the importance of high education and its effect in agriculture development.

Table4.1: Level of education of respondents

Education level	Frequency	Percent	Cumulative percent
primary	153	51.0	51.0
secondary	93	31.0	82.0
college	54	18.0	100.0
Total	300	100.0	

4.2.5 Agricultural Training

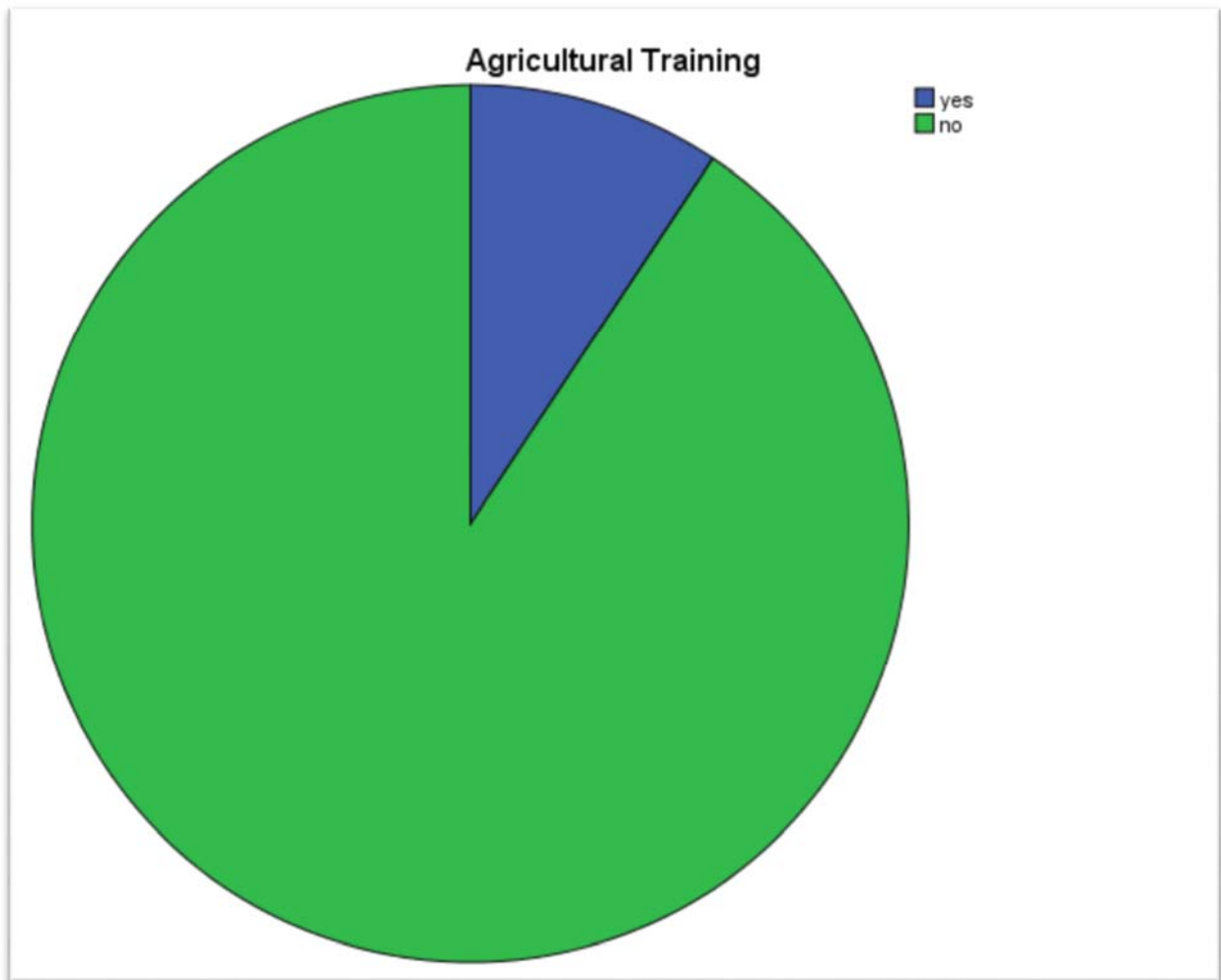


Figure 4.4: Agricultural training

Agricultural training is another form of education; it gives the farmers a better understanding of agriculture activities. According to the survey done in the area of the study, only 9.3% of the respondents have training in agriculture activities; while 90.7% have no training. This result is similar to the findings of machingura (2007) where it was found that the majority of household heads have no agricultural training.

4.2.6 Formal Employment of the Household Heads

As Figure 4.5 shows, the number of the farmers that were formally employed was 31.3% in the study area, while 68.7% were not. Thus, it is an indication that the primary occupation of most of the respondents was livestock farming; they invest their time in farming business because it is their only source of income. This finding is similar to Musemwa's study (2007), where it was found that the number of household heads that were not employed in the municipalities in the study area of Eastern Cape was high.

The fact that having one person at least formally employed is a key livelihood strategy because he supplies a salary to help in maintaining the business and/or use it to grow. In addition it offers some independence so that the farmer does not sell his livestock when in need rather he plans and chooses the best time for sale.

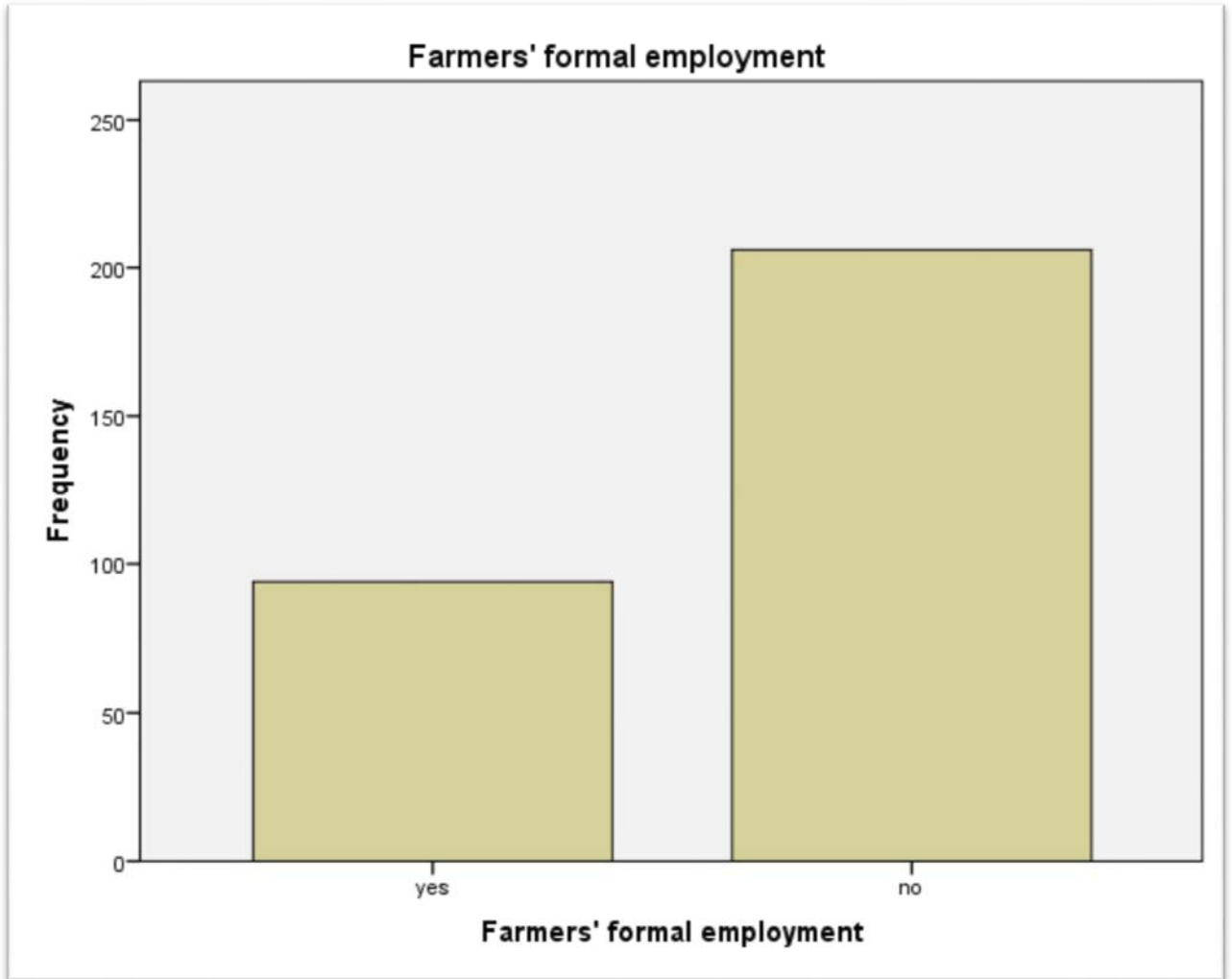


Figure 4.5: Formal employment of the household heads

4.2.7 Experience of the Heads of the Households

Experience in farming is an important variable since the success of a farmer depends on his/her practical experience in farming (Machingura, 2007). The survey shows that the experience ranges between 1 and 10 years for most of the farmers (54.3%), and 21.3% of the farmers have between 11 and 20 years of experience, while 24.3% have over 20 years of experience, as indicated in Figure 4.6.

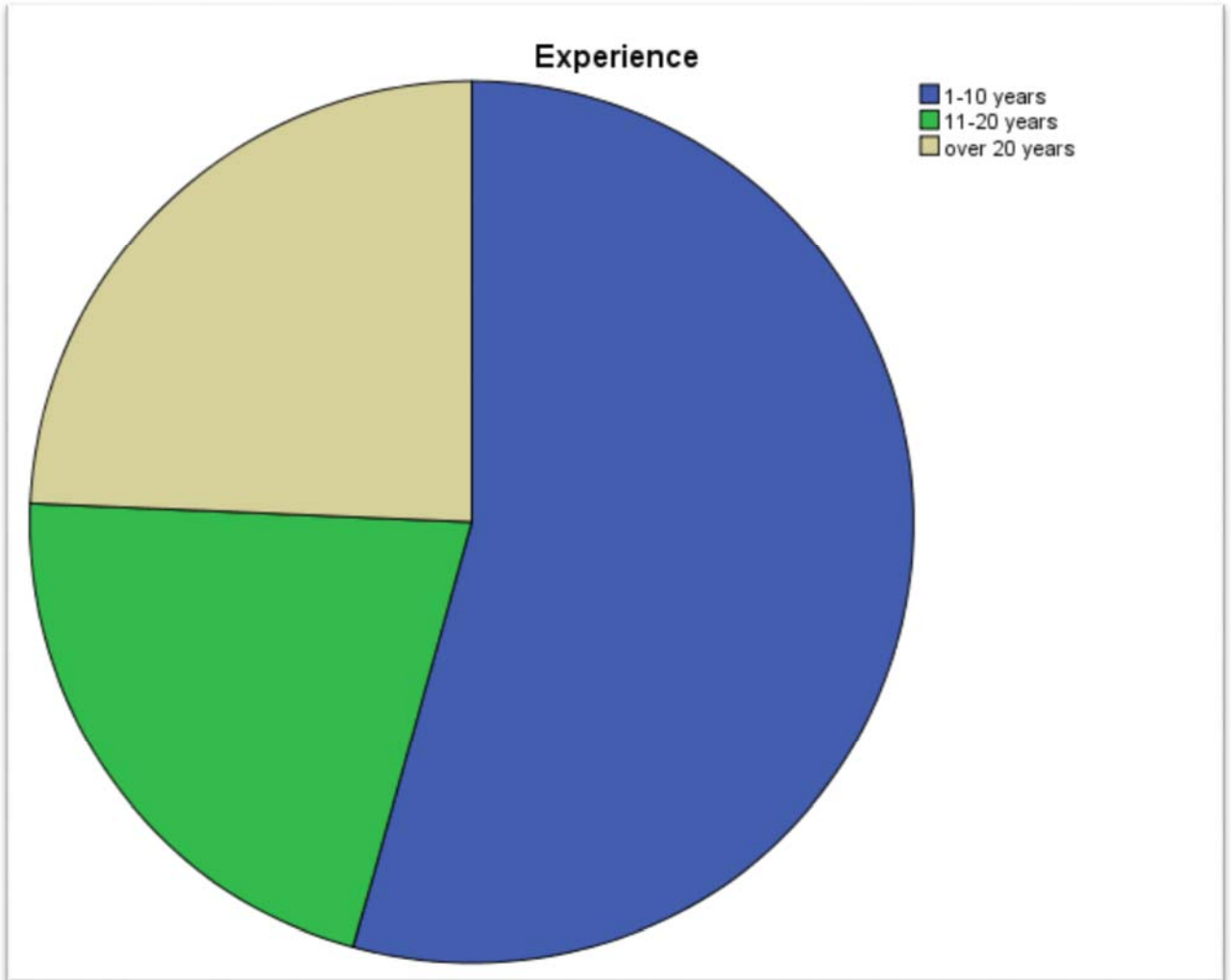


Figure 4.6: Farmers' experience in livestock farming activities

The longer a farmer is engaged in agricultural activities, the more marketing experience he gains. This gives him time to establish more personal contacts and allow him to compare different marketing channels and choose the channel that he/she is satisfied with.

4.2.8 Membership to an Agricultural Organisation

According to Machingura (2007), being a member of a farmers' union has benefits such as easy access to support services and acquiring farming inputs. However, the farmers also pointed out that there are other disadvantages associated with time and money for subscriptions. In this study, the percentage of farmers that were members in an agricultural organisation was 31%, and the remaining percentage (69%) was not. The benefits obtained

were discussed in the Focus Group Discussions with the farmers, and the response was that they prefer to lay more for assistance from extension officers than from agricultural groups. This decision caused small-scale farmers to be isolated and therefore they are not able to have timely information regarding market prices and opportunities.

4.3 Farm Characteristics

4.3.1 Livestock Herd Composition

Most of the interviewed farmers own only cattle with the percentage of 72%. 2.3% have only sheep; and 1.7% of them keep only goats. 24% of the participant farmers keep different animals as shown in Table 4.2.

Table 4.2: livestock composition

Livestock	Frequency	percent	Cumulative percent
cattle	216	72.0	72.0
sheep	7	2.3	74.3
goat	5	1.7	76.0
mix	72	24.0	100.0
Total	300	100.0	

4.3.2 Livestock Herd Size

4.3.2.1 Cattle

Cattle herd size is summarised in Figure 4.7; Most of the farmers (59.3%) have less than 20 cattle, followed by 18.7% who own a number ranging between 21 and 40 cattle. Fifteen percent (15%) of the cattle farmers keep 41 to 100 cattle, and only 3% own more than 100. A large number of cattle mean more wealth, in the study area only the commercial farmers own a considerable number of cattle. This is different from the finding of Montshwe (2006), where the average number of cattle kept by a farmer was ranging between 20 and 38 animal in

Sterkspruit (Eastern Cape Province) and Hammanskraal (Nort-West province) and only in Ganyesa (North-West province) the number was relatively high 84 cattle by farmer.

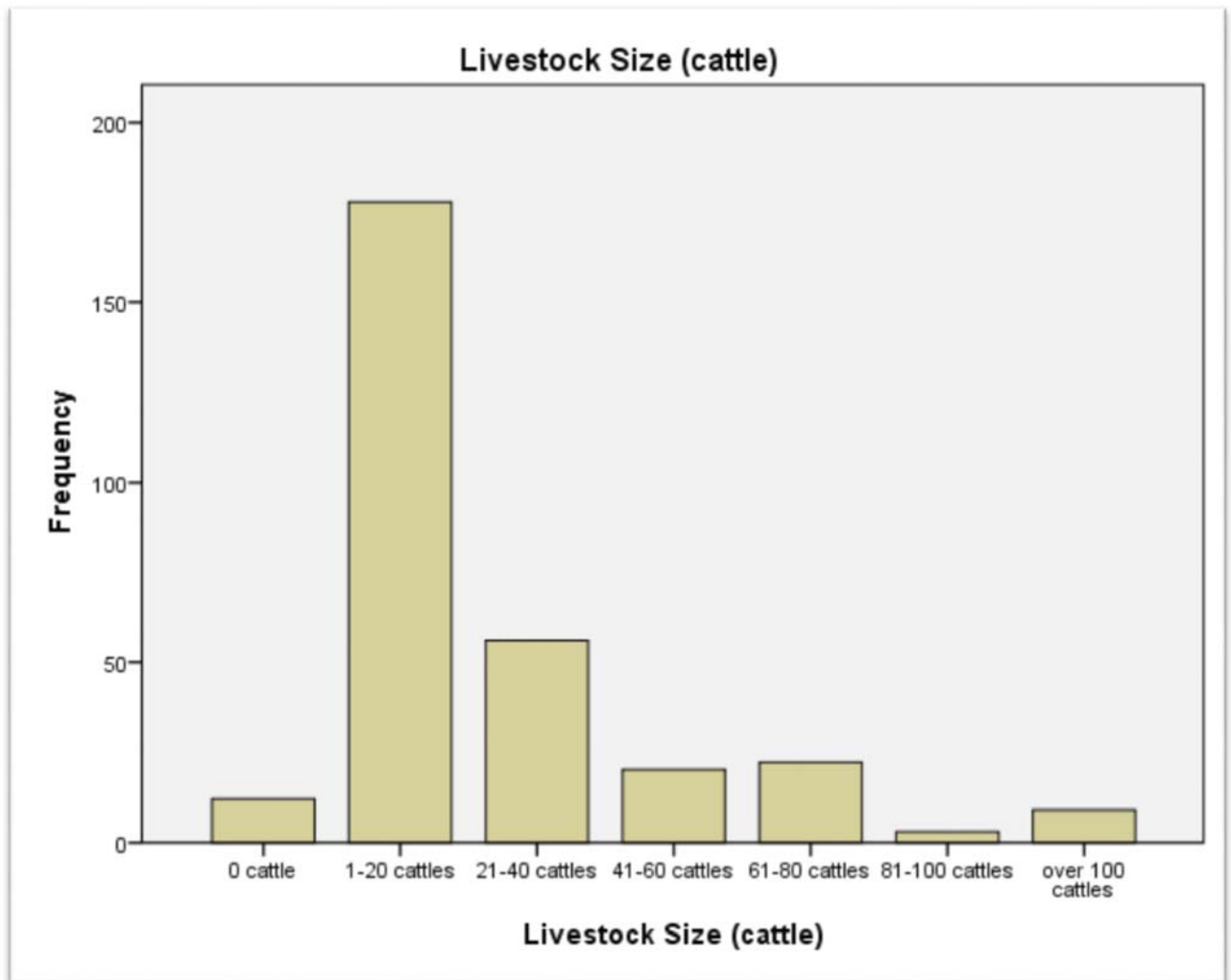


Figure 4.7: Cattle size

4.3.2.2 Sheep

According to the survey, out of the 300 farmers, only 47 own sheep. Nearly 9% of them have less than 20 sheep and 1.3% has more than 100. Just 5% keep a number of sheep ranging from 21 to 100. These results imply that the region of Mpumalanga is a small sheep production area.

Table4.3: Herd size of sheep

Sheep herd size	Frequency	Percent	Cumulative Percent
0 sheep	253	84.3	84.3
1-20 sheep	26	8.7	93.0
21-40 sheep	11	3.7	96.7
41-60 sheep	2	.7	97.3
61-80 sheep	3	1.0	98.3
81-100 sheep	1	.3	98.7
over 100 sheep	4	1.3	100.0
Total	300	100.0	

4.3.2.3 Goats

Of all the 300 farmers interviewed, only 41 of them keep goats and 1.7% of them possess only goats as livestock. The farmers that have less than 20 goats represent 9.3%, while 3.7% of the farmers have a number range between 21 and 60. Only, 2 farmers have more than 61 goats.

Table4.4: Herd size of goats

	Frequency	Percent
0 goat	259	86.3
1-20 goats	28	9.3
21-40 goats	6	2.0
41-60 goats	5	1.7
61-80 goats	1	.3
81-100 goats	1	.3
Total	300	100.0

4.3.3 Livestock Loss

The loss of livestock is common in rural areas, and that is why the participant farmers were asked if they have lost livestock in the past year and to specify the reason. They pointed out that the loss of animals is due not only to diseases or infections but also to theft. As shown in the figure below, the number of farmers that lost livestock in the past year, were more than the average (64.3%), compared with 35.7% who did not register any loss. Animal diseases and infections were the main reason for the loss in addition to some cases of theft registered as it was mentioned by Musemwa (2007), which results in lower marketable numbers and thus affect the sale of livestock.

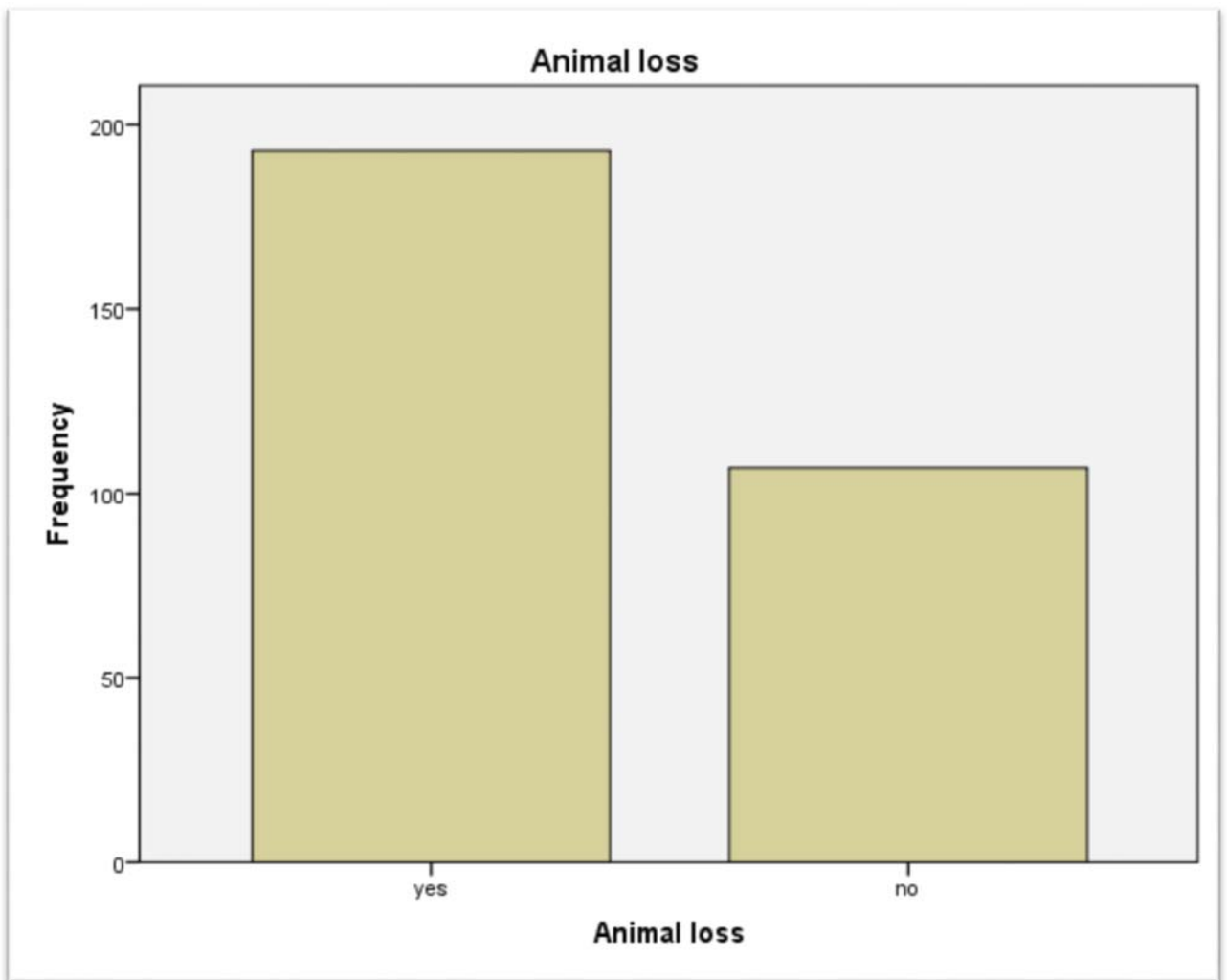


Figure 4.8: Livestock lose

4.3.4 Infrastructure

Infrastructure is an important aspect of livestock commercialisation. Musemwa (2007) mentioned that the farmers in Amatole (municipality in Eastern Cape province) travel the largest distance to sell their cattle mainly because of active cattle markets and also, because the infrastructure there is in good conditions. The inspection evinced that majority of the farms are situated in rural area with poor infrastructure (76.7%), and only 23.3% have a good infrastructure. The extension officers that worked with us in this study mentioned that the main assistance they provide for the farmers to improve infrastructure is just setting up fences around the farms, digging boreholes and building holding facilities. However, much efforts are needed to improve the road network in rural areas and fix and maintain market facilities.

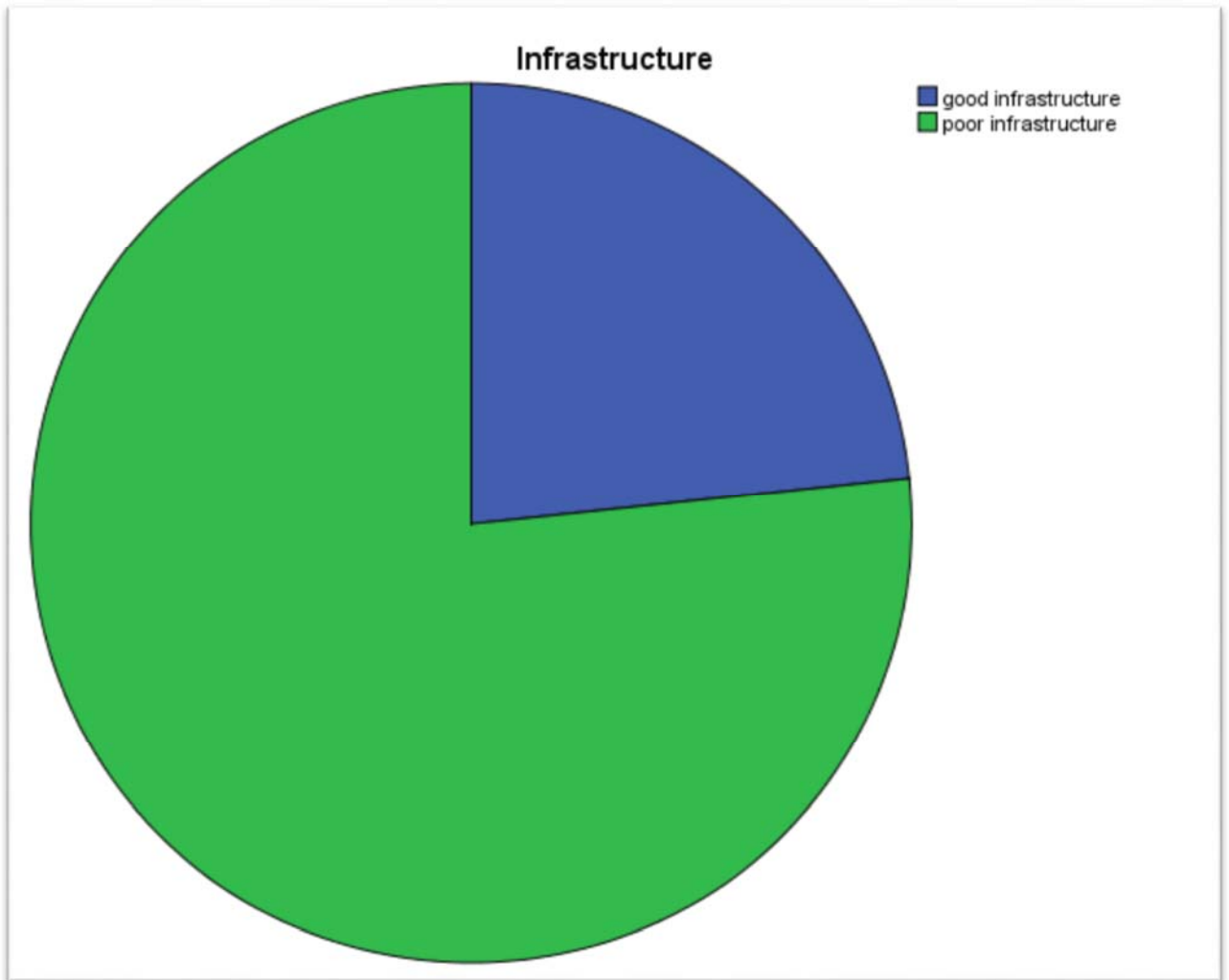


Figure 4.9: Infrastructure conditions

4.3.5 Farm Activities

4.3.5.1 Crop Production

The production of crops is one of the largest agricultural activities in the region of Mpumalanga, and this is because even livestock farmers do cultivate crops for two main reasons, sale and self consumption. Figure 4.10 shows that the livestock farmers that also produce crops, mainly maize (49.3%) are almost equal to those who exclusively produce livestock (50.7%). The investigation demonstrates that only 7% of the interviewed farmers cultivate crops for sale, while 42.3% for self consumption. This goes in parallel to the study of Musemwa (2007) where it was reported that majority of beneficiaries of the Nguni Cattle Project were involved in the production of different types of livestock, vegetables and crops.

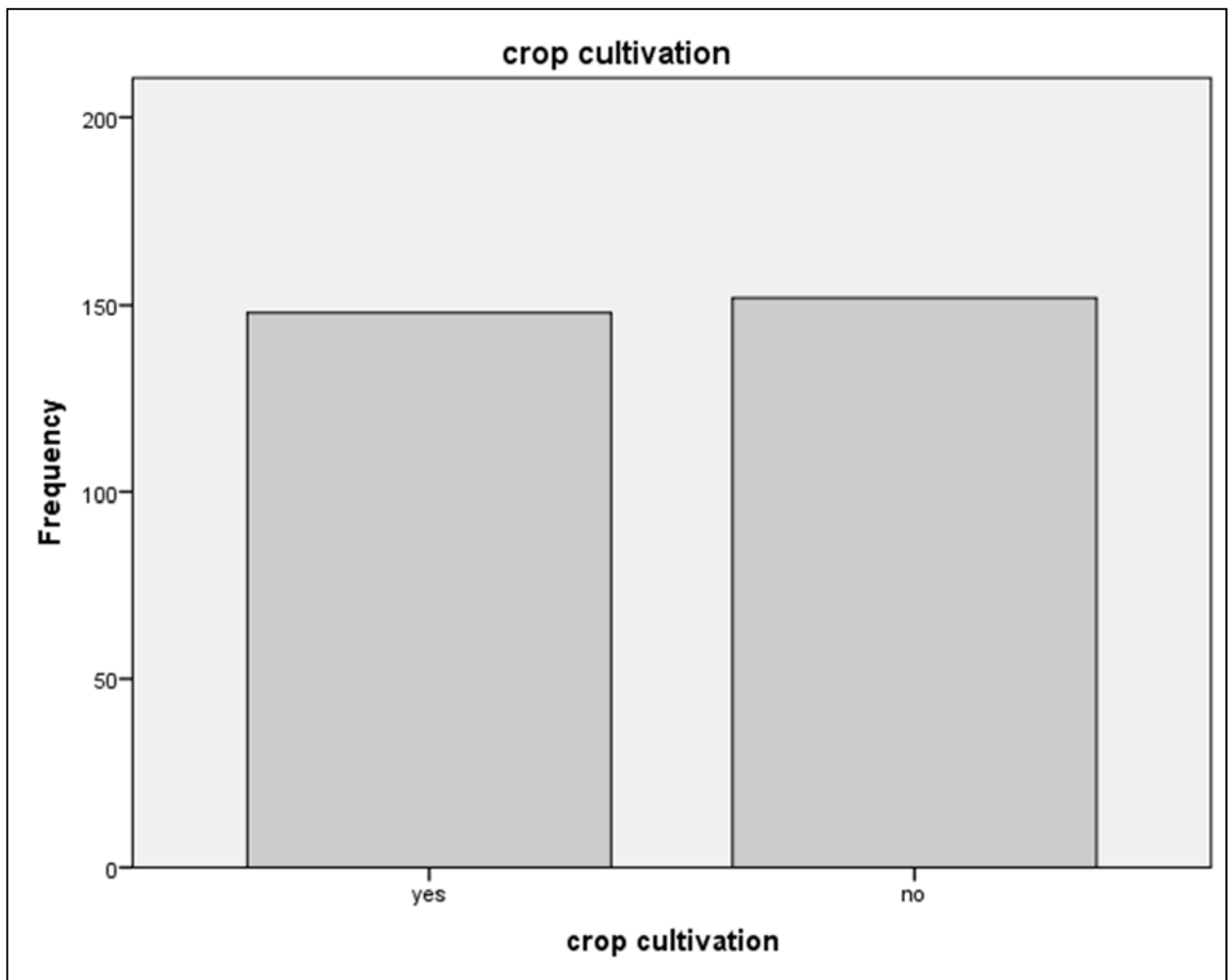


Figure 4.10: Crop cultivation.

4.3.5.2 Livestock Production

Table 4.5: livestock production

production	frequency	percent	Cumulative percent
produced	274	91.3	91.3
No production	26	8.7	100.0
Total	300	100.0	

Table 4.5 shows that 91.3% of the farmers interviewed have produced livestock in the previous year, while, 8.7% did not produce, and that was because of infections, drought and sometimes inadequate management. Other restrictions that contribute to the decrease in productivity as it was stated by the World Bank (1998) are animal's poor quality, insufficient feed supplies and slow technology adoption.

4.3.5.3 Livestock Sale

Table 4.6: Livestock sale and type of market Cross-tabulation

Livestock sale		Market type		Total
		informal	formal	
sale	Count	87	104	191
	% within animal sale	45.55%	54.45%	100.0%
no sale	Count	82	27	109
	% within animal sale	75.2%	24.8%	100.0%
Total	Count	169	131	300
	% within animal sale	56.33%	43.67%	100.0%

Concerning the sale, an approximate of 64% of the participant farmers has sold livestock in the previous year, and more than one-third (36%) did not sell any animal despite that their primary reason for keeping livestock is to sell it for cash. Even if they did not sell livestock for many reasons, they were satisfied with consuming its products such as milk and meat.

About 45% of the interviewed producers that sold livestock used informal markets, while 54% sold through formal markets. The respondents that did not sell livestock in the previous year were asked about the channels they would have used if they did sell. Only 25% of them responded that they would use formal markets to sell, while the remaining 75% said that they would sell through informal markets. Each of the choices was due to numerous reasons such as market availability, price and transportation cost. This is consistent with the results of a study on transaction cost and cattle farmers' choice of marketing channels in north central Namibia by Shiimi (2009) where it was indicated that farmers believe that marketing cattle through the formal market involves many inconveniences, thus leading to high transaction costs. The study concluded that efforts are needed to change the negative perception of formal markets by informing the farmers about the economic importance of selling through the formal market, as this is a means of directly entering the economic mainstream.

4.4 Use of Credits and Subsidies

Machingura (2007) stated that access to credits is an important aspect in farming activities. However, access to credits services is very limited in the study area, for only 8% among the participants have utilised credits for their farming activities. Quite the reverse, with respect to the support from the government, which is presented in form of subsidies such as feeds, livestock, provision of fences, borehole and medications to treat diseases and prevent infections, an average number of the interviewed farmers (51%) have benefited from subsidies in order to improve their farming activities. This implies that the respondents have no ability to bear risks that comes with using credit in their business and they are quite afraid of not being able to pay it back, thus, limits the development of this sector in the study area. This similar to the finding of Machingura (2007) where 75% of the households in the survey did not have access to credits.

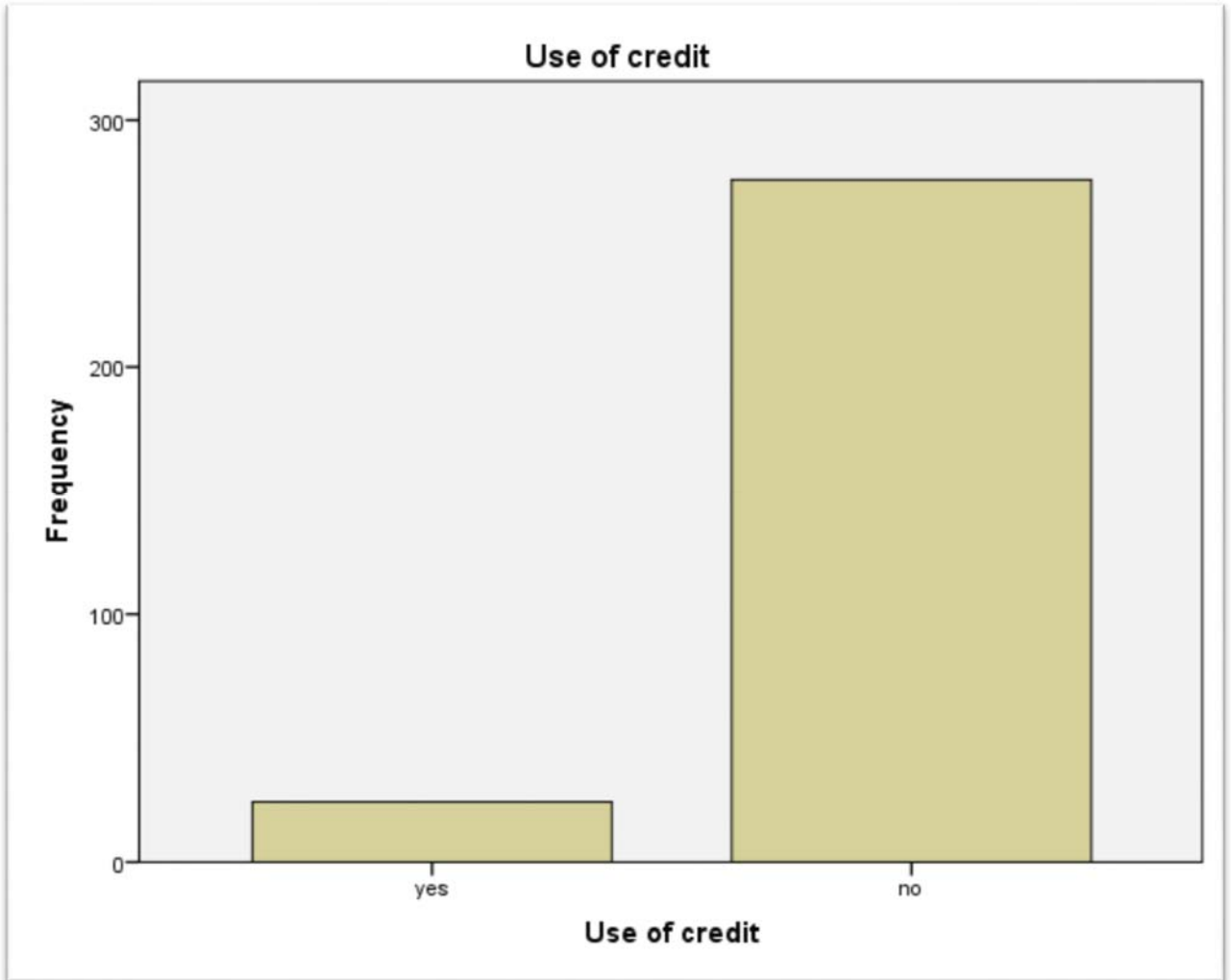


Figure4. 11: Use of the credits by the farmers

4.5 Transport of Livestock

Musemwa (2007) stated that because of impoverishment, only a small number of people in rural areas have trucks or pickups that may be able to transport cattle to faraway market. Sometimes, even if the transport is available, shortage of money makes it impossible for the farmers to take their livestock to markets. For example, only 12.3% of all the farmers had trucks for transporting their animals to markets, and the rest rent trucks for that reason. It should be noted that it is not affordable for every farmer to own transportation mean, however if they would work collectively with the same transport, the price would be much cheaper.

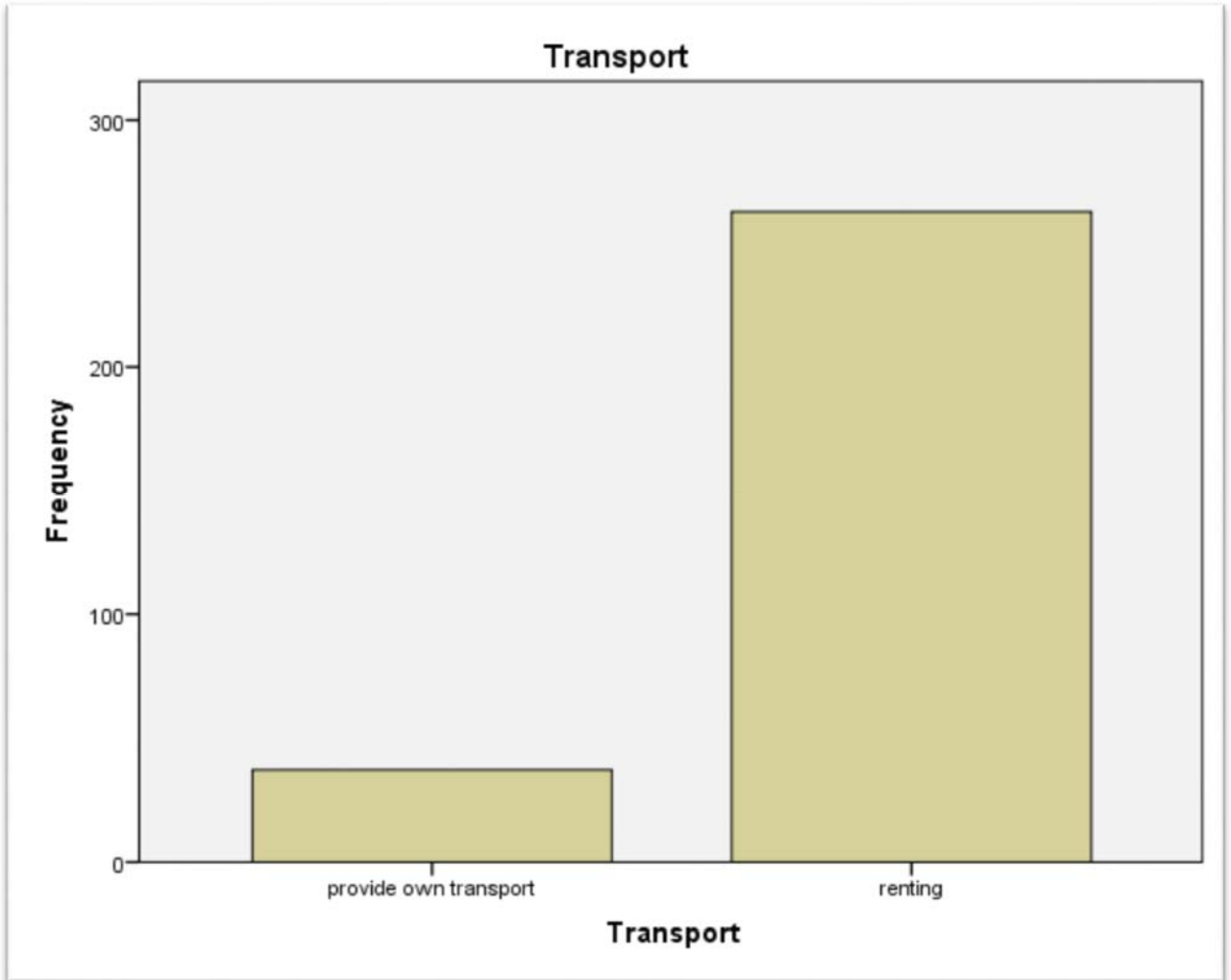


Figure 4.12: Transport of livestock

4.6 Marketing Strategies

4.6.1 Marketing Channels

In South Africa, most of the rural producers use five marketing channels to sell their cattle according to Montshwe (2006). These marketing avenues are butcheries, abattoirs, speculators, private sales and auctions. On a similar note, this current study found out that there are five marketing channels with a small difference where speculators are not used, and a new channel has emerged which is self slaughtering and sales. The use of this last channel

would have its impact on decreasing the sale to butcheries and abattoirs as it was discovered in this study where the use of those two channels registered the lowest percentages.

Table4.7: Marketing channels used by the farmers

Marketing channels	Frequency	Percent
abattoirs	5	2.6
sell to farmers or private	17	8.9
butcheries	13	6.8
auction	86	45.0
self slaughtering and sell meat	70	36.6
Total	191	100

As Table 4.7 indicates, the main marketing channel used by the respondents is auction (45%), followed by self slaughtering and sell meat with a ratio of 36.6%, next is sell to farmers or private, which has an aggregate of 8.9%, while butcheries is rated 6.8%, and abattoirs has the least fraction of 2.6%. These results imply that the best option to sell livestock when it's available is auction, which would affect market price for live animals.

In Mpumalanga, the respondents that have sold livestock in the previous year admitted that they preferred a particular channel for many reasons. For 21% of them, the marketing channel was chosen because it offered them a better price; meanwhile for 36% of them, the choice was based on easy access to the market. About 10% attested that they chose a particular marketing channel because they could sell many animals at once.

4.6.2 Access to Market Information

Musemwa (2007) averred that it is very necessary that farmers are knowledgeable as regards the market demand and the prices offered because they are very crucial when making decision pertaining to whether to sell or refrain from selling animals. However, in spite of its

essentiality, sources that can provide this information in communal areas are limited (Montshwe, 2006). In this study, it was discovered that most of the participants did not have access to market information as shown in the figure below.

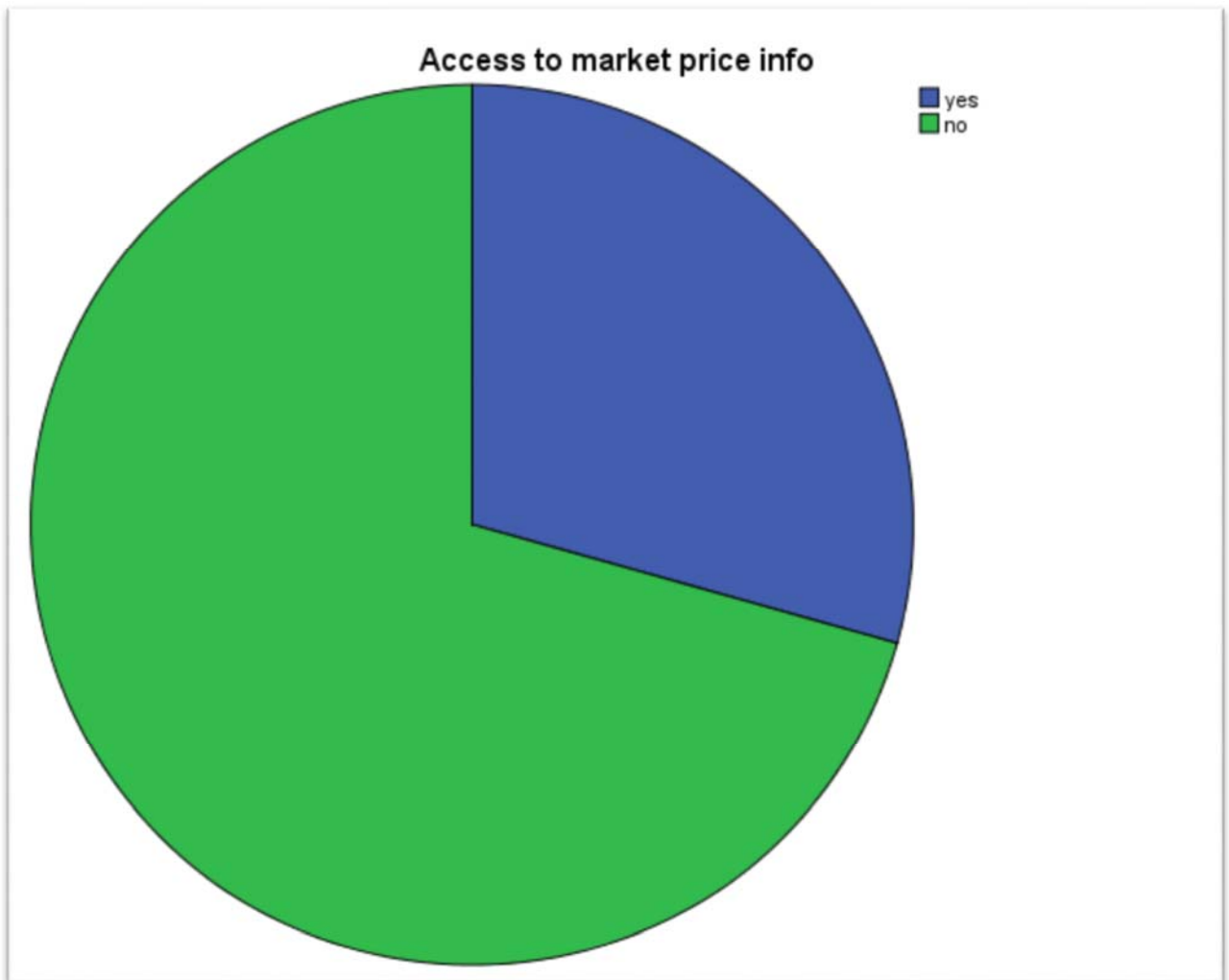


Figure 4.13: Access to market information

4.6.3 Use of Advertisement

The role of advertising in the marketing of livestock is very important. Nonetheless, despite its centrality in marketing, Musemwa (2007) in the study carried out in the Eastern Cape province mentioned that advertising especially to neighbours during meetings is the most popularly used marketing strategy. Correspondingly, in this present study, only 29% of the interviewed households use advertising to market their livestock. Thus, it is an indication that

majority of farmers do not view livestock farming as a business. The main way of advertising is speaking in community gatherings and meetings, and also by placing adverts in local newspapers.

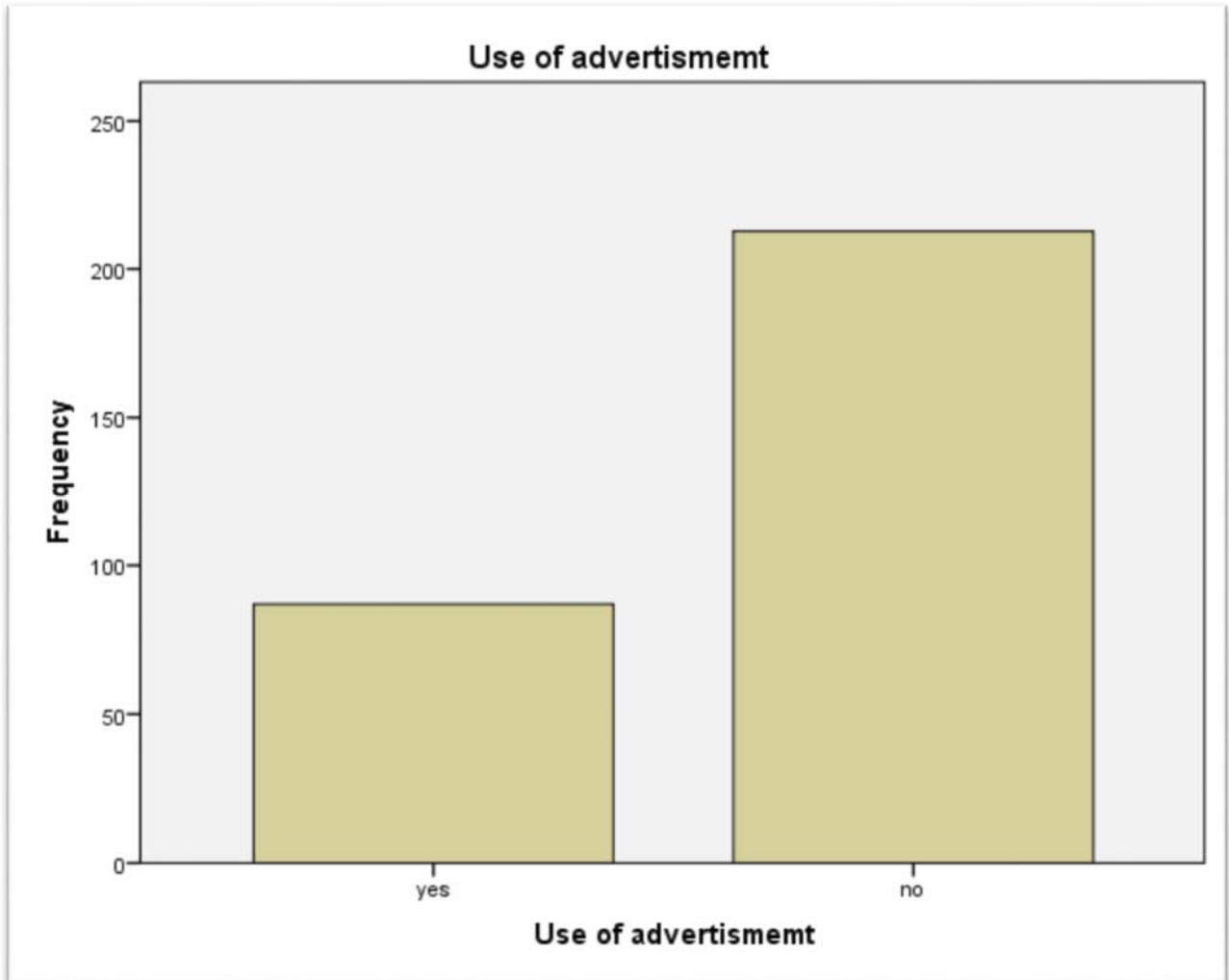


Figure 4.14: Use of advertisement

4.7 Farmers' Perceptions on Factors Influencing Livestock Commercialisation

Regarding the views of the farmers on the factors that influenced livestock marketing mostly, their responses were different. According to them, as pictured in Table 4.7 below, the most influencing factors were infrastructure and limited access to land and capital with 46%, followed by drought, with a proportion of 29%, while the quality of animals and infections was rated low, just 12.7%. Ten percent of the farmers posited that market demand is more

influencing, and a minimum of 2.3% regarded training and farm management as more influencing.

Table 4.8: Farmer’s perception on factors influencing livestock commercialisation

Factors	Frequency	Percent	Cumulative Percent
drought	87	29.0	29.0
market demand	30	10.0	39.0
quality of Animals/infections	38	12.7	51.7
land, capital, infrastructure	138	46.0	97.7
training, farm management	7	2.3	100.0
Total	300	100.0	

4.8 Summary

The investigation of the socio-economic characteristic of the farmers evinced that majority of the respondents were married men, and above 40 years of age, with at least primary education, besides possessing less than ten years of experience. Likewise, nearly one-third of them were formally employed. A greater number of them are cattle owners; on the contrary just some of them rear sheep and goats. An average number of the interviewed farmers cultivate crops in parallel to livestock. Most of them have no access to credits; however, they

benefit from government subsidies. A large number of the farmers rent trucks and use auction to sell their livestock. A lot of them have no access to market information, while just a few of them advertise their products. From the results of this study, it is clear that much is needed to be done in order to improve livestock farming in the region and special focus should be directed to educate and well-inform livestock producers on marketing opportunities. With the right knowledge, farmers would be able to make more informed decisions about the tradeoffs between income and variability in income associated with production and marketing options and that would help to move the industry forward.

CHAPTER FIVE
RESULTS OF REGRESSION ANALYSES

5.1 Introduction

The results and the discussion of regression analyses are presented in this chapter. In the first section, results of Logit model applied for the factors affecting access to formal markets are presented and in the second section, the two stage least square regression analysis for factors influencing marketing inefficiency are articulated.

5.2 Results of Market Access Regression Analysis

A Logit regression was applied in order to identify the factors affecting market access. In preliminary to apply the logit model, detecting multicollinearity between explanatory variables tests was considered. Subsequently, it was established that the data used in this study was free from the mentioned problem.

The explanatory variables that were considered in the analysis were gender, age, level of education, formal employment, agricultural training, experience, organisation membership, livestock composition, herd size of cattle, sheep and goat, infrastructure, livestock loss, credit access, crop cultivation, transport ownership, transportation cost, marketing channel used, market price information, use of broker or agency, advertisement, farmers’ perception and municipality. The results of Logit analysis are presented in table below.

Table 5.1: Logit model summary

Model summary Logistic regression Log likelihood = -73.574863	Number of observations = 300
	LR chi2(24) = 246.04
	Prob > chi2 = 0.0000
	Pseudo R2 = 0.6258

In the Logit model applied in this study, the value of 0.6258 (the Pseudo R squared) strongly suggests that the independent variables used in the study, describes 62.58% of change in the possibility of farmers selling their livestock on formal markets. The model's likelihood ratio (LR) chi square statistic is of 246.04. In order to test how well the model used fits the data, the LR chi square statistics was considered to evaluate the model's goodness of fit with the p-value for the applied model ($\text{prob} > \chi^2$); which is less than the standard value of 0.05. This indicates that overall the model used is significant and a minimum of one of the factors used in the equation is no-zero. This is accurate according to Bahta and Bauer (2007), who mentioned that if the p-value for the general model used statistic is smaller than the standard value of 0.05, then it is evident that at a minimum one of the independent variables play a part in the results.

Table 5.2 presents the logit model analysis results. It should be noted that marginal effects after logit was computed for the purpose of measuring the effect of explanatory variables on the possibility that farmers sell their livestock through formal markets.

As depicted in the table below, out of all the independent variables that were run in the Logit regression, only seven variables were significant at 1% and 5% significance level. Five of these variables were positively and significantly affecting the livestock sale probability via formal market. These are transport ownership, transport cost, market price information, advertisement and farmers' perception. The two remaining variables were negatively and significantly influencing the choice of selling through formal market, namely marketing channel used and municipality.

Table 5.2: Results of the analysis of the Logit model

Variables	Coef.	Marginal effect	Std.Err.	z	P> z	[95% Conf. Interval]	
gender	.6214953	.1020518	.5960743	1.04	0.297	-.5467889	1.78978
age	.024727	.0044478	.0215093	1.15	0.250	-.0174304	.0668844
education1	-.5134254	-.0923536	.7248356	-0.71	0.479	-1.934077	.9072263
education2	-.1703732	-.0301267	.6497843	-0.26	0.793	-1.443927	1.103181
employment	-.4367901	-.0751392	.5652354	-0.77	0.440	-1.544631	.671051
experience	-.0561064	-.0100923	.0293665	-1.91	0.056	-.1136637	.001458
training	-1.505446	-.1885791	.8181315	-1.84	0.066	-3.108955	.0980619
organisation	.165293	.0302224	.7606094	0.22	0.828	-1.325474	1.65606
livstockcom	1.463093	.1756935	1.334047	1.10	0.273	-1.151591	4.077777
herdsizeca	.0067803	.0012196	.0099833	0.68	0.497	-.0127866	.0263471
herdsizeh	-.0011863	-.0002134	.0137276	-0.09	0.931	-.0280919	.0257193
herdsizego	-.02639	-.004747	.0216309	-1.22	0.222	-.0687858	.0160059
infrastruc	.773361	.1531884	.5374036	1.44	0.150	-.2799307	1.826653
livestockloss	.0338822	.0060789	.5347641	0.06	0.949	-1.014236	1.082001
crop	-.6460561	-.116210	.573539	-1.13	0.260	-1.770172	.478057
credit	-.9683632	-.1373766	.9068932	-1.07	0.286	-2.745841	.8091149
transport	1.562004	.345073**	.7430935	2.10	0.036	.1055678	3.018441
transportcost	.0015821	.000284**	.0007538	2.10	0.036	.0001046	.0030595
markch	-.8940195	-.160813*	.1990617	-4.49	0.000	-1.284173	-.5038657
infoprice	2.259109	.4659898*	.5360474	4.21	0.000	1.208475	3.30973
brok	.9794351	.2134629	1.097903	0.89	0.372	-1.172416	3.131286
adv	1.399974	.283764**	.5757494	2.43	0.015	.2715255	2.528422
fact	.494654	.088977**	.2275242	2.17	0.030	.0487147	.9405933
munici	-3.09909	-.649695*	.9441606	-3.28	0.001	-4.949611	-1.24857
_cons	.1074212		2.021976	0.05	0.958	-3.855579	4.070422

*and ** = significant at 1% and 5% level respectively

Source: survey of the study area (2017)

5.2.1 Transport Ownership

The results showed that the variable ‘transport’ had a positive and significant relationship with livestock sale through formal markets, which indicates that when the farmer owns a truck to transport livestock to the market, the chances of sale grows. In consistence with this result, are the findings of Musemwa (2007), who stated that farmers could sell more when the cost of transporting cattle is cheap and this is only if transportation means are at one’s disposal. This study’s results denote that the probability of selling livestock through formal market increases with 34% when the farmers provide their own transport.

5.2.2 Transport Cost

Another positive and significant variable was transport cost. It was not expected that transport cost would positively influence the probability of selling live animals through formal market, and this is possibly due to the fact that farmers in time of need may sell through formal markets regardless of the cost of transportation. This outcome corresponds with Shiimi (2009) findings which indicated that when farmers are in need of money, they do sell their animals through formal market.

5.2.3 Market Price Information

Market price information was the variable with the largest positive marginal effects on formal market access. The results ascertained that getting access to market price information raises the probability of farmers selling livestock by 46%. This result underscores the relevance of market price information; as such farmers should strive to know the market price before selling. It was equally observed that if the prices offered are encouraging and satisfying, farmers take the decision to sell, and if the market prices are relatively low, they keep their livestock waiting for the prices to go up or they sell through informal markets. This outcome is similar to the findings of Nkhori (2004) where it was found that households with information in terms of prices and opportunities are more likely to sell their cattle through formal market (sell to Botswana meat commission and to butcheries) relative to those without information.

5.2.4 Advertisement

The use of advertisement was statistically positive and significant with market access. Thus, advertisement is a significant factor influencing the sales of livestock, as it was recorded that farmers who advertised attracted more buyers, and a consequent increase in their sales. The results, therefore, suggested that the probability of selling through formal market increases among the farmers who do advertise with 28%. This finding is consistent with those of Musemwa (2007), which mentioned that Promotion through price cuts, for example, was the most commonly used strategy with more than 50% of the farmers have marketed their cattle using this method in Chris Hani municipality (Eastern Cape Province).

5.2.5 Farmer's Perception

Farmer's perception of livestock commercialisation was included in the analysis as a variable (fact), to check if it was associated with market access. The results indicated that it has a positive significance on the sale of livestock through formal market. The implication is that the more the farmers become aware of the condition of the sale, the more they would sell through formal market. Following this, the results suggested that one unit change in farmer's perception would raise the possibility of sale via formal market by 8%. Musemwa (2007) stated that analyzing perceptions can contribute towards improving the marketing situation of the neglected indigenous cattle by determining the sale opportunities in the correct perspective and comparing them with other needs of cattle farmers.

5.2.6 Marketing Channel

Marketing channel used by the farmer was associated negatively with market access. This implies that the choice of such channel reduces the sale of animals through formal markets. The results may be due to the fact that the farmers would sell through informal market or not sell at all to avoid the extra charges encountered when using a formal channel to sell their livestock. Shiimi (2009) added that satisfaction with the experience of selling to the formal market determines the individual's interest in that particular marketing channel. The lower the level of satisfaction, the fewer cattle the producer will be willing to sell through that formal market channel.

5.2.7 Municipality

Municipality was another variable with negative significance on formal market access. It was the variable with the largest marginal effects on market access. Municipalities may differ in climates and these differences result in different vegetations and variation in the livestock species kept and its size, including the location of the household and the active markets that are usually available in the major towns in the municipality. From the foregoing, the results suggested that a change in the municipality would decrease the probability of sale through formal market by 64%. This can be attributed to the fact that in rural communities, access to market is difficult, thus resulting in the farmers not selling, or if they do sell, they use informal market to avoid the charges arising in selling through formal markets.

5.3 Marketing Inefficiency Regression Analysis

The number of the sample was reduced from 300 to 191, because some respondents did not participate in any sale action during the previous year. Therefore, no marketing efficiency was calculated for those farmers.

5.3.1. Variables Used in the Analysis

The variables that were hypothesised to affect marketing inefficiency in this study were identified as sixteen independent variables. These variables were measured as continuous or discrete; which are market access, livestock composition, herd size, infrastructure, crop cultivation, credit access, transport ownership, use of broker or agency and the basic characteristics of the farmers which are gender, age, level of education, employment, experience, training and organisation membership.

5.3.2. Results of Marketing Inefficiency Regression Analysis

Before proceeding to analysing the factors influencing marketing inefficiency, it should be registered that market access was identified as endogenous variable because the factors that were assumed to affect marketing inefficiency also were expected to affect market access. Therefore, in the first stage regression, market access became the dependent variable. In the second stage regression model, the values predicted in the first stage substitute the original values of endogenous variables.

a. First stage regression summary

Table 5.3 enunciates the abstract of the outcome of the first stage regression.

Table5.3: Statistics summary of the first stage regression

Variables	R square	Adjusted R squared	Partial R square	Robust F(3, 173)	Prob > F
Market access	0.4929	0.4398	0.1804	12.0992	0.0000

With the R squared of the model fitted in the first stage, a signification that the independent variables explained about 49% of the variation of the dependent variable market access, and the F statistics value (12.0992) with the small value of p . These indicate that the applied model in general is statistically significant; where market price information, advertisement and transport cost were the variables used as instruments.

b. Endogeneity test

The tests of endogeneity were computed under the null hypothesis that the variable market access is exogenous. The results were as follow:

Robust score chi2 (1) = 7.49735, ($p = 0.0062$) and;

The F-statistics Robust regression F (1,173) = 7.79593, ($p = 0.0058$).

With small values of p at 1% significance level, the null hypothesis that market access is exogenous was rejected and it was concluded that the variable is endogenous.

c. Results of marketing inefficiency analysis

Table 5.5 displays the outcome of the regression analysis for marketing inefficiency, while Table 5.4 shows the model summary.

Table 5.4: The SLS regression summary

SLS regression	
Number of observations	191
Wald chi2(16)	56.57
Prob > chi2	0.0000
R-squared	0.1156
Root MSE	.05629

From the results shown above, the independent variables account only for twelve percent (12%) changes in the dependent variable marketing inefficiency as evidenced by the value for R squared. The small value of the R-squared implies that additional factors that are not accounted for in the study, but which greatly influence the dependent variable marketing inefficiency. Generally, the model used was statistically significant, with Wald chi2 (16) =

56.57 and Prob > chi2 = 0.0000. These demonstrate that at least one of the parameters tested in this study contributes to the outcomes of the dependent variable analysis; hence, overall the model applied can statistically and significantly predict the dependent variable marketing inefficiency.

Table 5.5: Results of marketing inefficiency regression analysis

Variables	Coef.	Robust Std. Err	z	P> z 	[95% Conf. Interval]	
marketaccess	.0748737*	.0251189	2.98	0.003	.0256417	.1241057
Gender	-.0099658	.0106617	-0.93	0.350	-.0308624	.0109307
Age	-.000578	.0003673	-1.58	0.115	-.0012986	.0001414
education1	.0160239	.0157111	1.02	0.308	-.0147694	.0468171
education2	.0096589	.015854	0.61	0.542	-.0214143	.0407321
employment	.0166376	.0132058	1.26	0.208	-.0092453	.0425205
experience	.0007002	.0005402	1.30	0.195	-.0003585	.001759
training	.0145306	.0207136	0.70	0.483	-.0260672	.0551284
organisation	.0197311	.0149846	1.32	0.188	-.0096381	.0491004
livstockcom	-.0235657**	.0114137	-2.06	0.039	-.0459361	-.0011952
crop	.0007597	.0111759	0.07	0.946	-.0211447	.0226641
credit	-.0139388	.0151094	-0.92	0.356	-.0435526	.0156751
transp	-.022771	.0145227	-1.57	0.117	-.0512351	.005693
brok	-.0034279	.017195	-0.20	0.842	-.0371294	.0302737
herdsizeca	.0003787	.0002036	1.86	0.063	-.0000203	.0007777
infrastruc	-.0250297*	.0090226	-2.77	0.006	-.0427136	-.0073458
_cons	.0920117	.0310616	2.96	0.003	.0311321	.1528914

*significant at 1% level; ** significant at 5% level

Source: survey of the study area (2017)

The results indicated that out of the sixteen variables that were used in the study, only three were significantly related to marketing inefficiency ($p < 0.05$); namely, market access, livestock composition and infrastructure.

5.3.2.1 Market access

Market access significantly and positively affects marketing inefficiency. The coefficient showed that an increase in the sale of livestock through formal market led to an increase in marketing inefficiency by 7%. This situation is significant and logical because farmers selling

through formal market, pay for transportation to the market and also pay the fees of holding facilities and feed inside the market as it was discussed in literature section. This finding goes a long with those of Mendelsohn (2006) who indicated that in rural areas with impoverished road networks increase the cost of transportation of livestock to markets, and this impact negatively upon livestock commercialisation. To avoid these extra charges, the farmers prefer to sell through informal markets where the costs would be paid by the buyers, especially when selling at their farms. Therefore, paying high marketing cost leads to increase in marketing inefficiency.

5.3.2.2 Livestock composition

A negative and significant association was identified between keeping different species of livestock such as cattle, sheep and goats, or keeping only cattle and marketing inefficiency. The coefficient indicated that farming only with cattle tends to reduce marketing inefficiency by 2%. These results suggest that farming only with cattle would make the farmers to pay all of their attention and focus their efforts on making profit to increase their income, and this would only happen if they achieve marketing efficiency.

5.3.2.3 Infrastructure

Infrastructure was statistically significant and it negatively influenced marketing inefficiency, which means that a good infrastructure tends to decrease marketing inefficiency as indicated by the coefficient in the table above. A good infrastructure means roads, markets, holding facilities are available and in good conditions, and therefore, the marketing cost will be cheaper. Poor infrastructure imposes restriction to improve marketing of livestock in general. Contrary to this and according to Fidzani (1993), poor infrastructures have no effect on marketing of livestock because a lot of buyers have their own transportation services. The results of this study suggested that a one unit change in infrastructure would reduce marketing inefficiency by 2%.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction Summary

Marketing of agricultural products remains one of the fundamental issues to be addressed if communal farmers are to benefit more from livestock farming (Musemwa *et al.*, 2008). Different factors influence marketing of livestock. Identifying those factors was the thrust of the current study and analysing their influence on market access and marketing inefficiency. The summary of the findings of this research are provided in this chapter on the factors influencing market access and marketing inefficiency, as well as recommendations in order to improve marketing of livestock.

6.2 Conclusions

This research was carried out in the province of Mpumalanga. Ownership of livestock and readiness to take part in the study were the ground for the sampling technique that was used in this study. Structured questionnaire was administered to 300 livestock households that were interviewed with help from extension officers during the process of data collection. Descriptive statistics was utilised regarding basic characteristics of the households. A logit regression model was used to analyse market access, while two stage least square regressions was applied for factors affecting marketing inefficiency.

The respondents were relatively old married males with at least primary education level and have less than 10 years of experience. A large percentage of them are cattle owners mainly but they do keep different livestock species for many reasons, mostly for sale.

The farmers used different marketing channels, but the majority use auctions and rent trucks for transportation to the markets. Most of them have no access to credits but they do benefit from government subsidies such as livestock feed, fences and support from extension officers.

Most of the participants have no access to market information and a few of them do advertise (Objective 2).

The results of market access regression analysis indicated that transport ownership, transport cost, market price information, advertisement and farmer's perception are the variables that were positively significant with market access. Conversely, marketing channel and municipality had negative significance on market access (Objective 3).

The results of marketing inefficiency regression analysis revealed that access to formal market was the only variable that tended to increase marketing inefficiency; whereas, keeping only cattle and infrastructure were the factors leading to reduce marketing inefficiency (Objective 4).

Therefore, the study concluded that to reduce marketing inefficiency, then it is crucial to focus attention on how to ease dissemination of information, in addition to improving infrastructures which are critical to lucrative farming so as to give small-scale farmers an easy access to the markets.

In this study, the marketing system of livestock in Mpumalanga province was investigated, and different factors were identified as constraints causing low market participation. Addressing the often overlooked livestock marketing problems will provide useful and maintainable strategies in order to alleviate market participation and improve marketing efficiency especially in communal areas. Educational institutions and support services could work hand in hand to provide training programmes on farm managements and marketing strategies.

Therefore, government, agricultural organisations, commercial farmers and small-scale farmers should work together to ensure the development of the livestock marketing system. Even though it is difficult, but it is necessary to overcome the challenges.

6.3 Recommendations

The following recommendations were made:

Addressing the factors acting as constraints in livestock marketing would improve the efficiency of the marketing system. In addition, it helps in developing useful techniques that will ameliorate the strategies used in livestock commercialisation.

Encourage and integrate more youth participation in agriculture activities. This could be done by giving more facilities specially when granting credits and provide an easy access to information and training programmes. Young people seem to be more open to adapt to the new techniques used in agriculture sector.

Special focus should go to infrastructure; it deserves to be given more attention if farmers are to achieve marketing efficiency. Lack of infrastructure causes the farmers not to sell or to pay a heavy price when it comes to transporting the livestock to the markets. Efforts are needed urgently to repair and update the road system in poor rural areas. Promoting transportation infrastructure in rural areas could help enhance the commercialisation of livestock which in return benefits farmers and reduce poverty.

It is advisable that farmers and traders contribute in some way to the maintenance of marketing facilities by allocating a portion of the levied commission at auctions towards the farming community. This will enable local farmers to maintain the existing marketing facilities. In doing so, traders and farmers share the maintenance cost. A good infrastructure will ensure easy access to the markets, and will reduce the cost of transportation.

Transportation of livestock has to be addressed because it affects greatly market access as shown in this study. If farmers from one production area would be willing to organise themselves and work in groups to transport their animals in large quantities and use the same transport, the cost of transportation to the market would be cut down.

Educate farmers on marketing activities and encourage them to organise themselves into groups. This will allow the young farmers to benefit from the experience of the elders and will guarantee them to have more access to the markets information.

Extension officers should come up with long term plans to help and support small-scale farmers if they are to compete with the commercial farmers. Veterinary services are needed to work closer with the farmers and help with preventing and treating diseases to minimise the losses. This will certainly not only help to increase market participation but also, marketing efficiency and it will benefit the economy overall.

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APPENDICES

Appendix 1: Questionnaire

Factors influencing market access and livestock marketing inefficiency in Mpumalanga Province

***N.B:* Information provided in this questionnaire will be treated with utmost confidence.**

Questionnaire N:

Date of interview:

1. Farm presentation:

-Name of the farm (just initials):

.....

-Initials of the owner:

.....

...

-Date of creation:

.....

.....

-Localisation:

-District:

Province:

.....

-Distance from the farm to:

-Tarred Roadkm Marketkm veterinary centre

.....km

2. Farmer characteristics:

Respondent initials and occupation:

.....

.....

2.1 Owner characteristics:

1. Gender

Male

Female

2. Age Years

3. Educational level Primary Secondary College

Others, Specify:

4. Marital Status married single divorced widowed

5. Is the owner formally employed? Yes No

5.1. If yes what is the occupation?
.....

3. Farm structure:

1. Farm members:

Name of Farm members	Relation to owner	Gender	Age	Level of education	Occupation

2. Do you need more employees? Yes No

2.1. If yes, what type? Unskilled Skilled

2.2. What period? 2.3. What occupation?

.....

4. Farm assets:

4. a. Livestock composition:

Structure	Number		Origin				Total number
	Own	Share	Home born	Family	Purchase	Gift	
Cattle herd :							
Cows							
Bulls							
Heifers							
Male calves							
Female calves							
Oxen (for breeding)							
Oxen(fatten)							
Sheep flock:							
Lambs (0-6months)							
Male lambs (6-12months)							
Female lambs (6-12months)							
Ewes							
Rams							
Castrates (fattening)							
Goats flock:							
Kids(0-3months)							
Male kids (3-12months)							
Female kids (3-							

12months)							
Does(female goats)							
Bucks(male goats)							
Castrates(fattening)							

4. b. Assets:

Type of asset	Number	Value of asset
Car		
Cultivator		
Rotavator		
Harrow		
Plough		
Seed planter		
Sprayer		
Center pivot irrigation		
Farm truck		
Forage harvester		
Mower		
Bulk tank		
Milking machine		

5. Farm management and activities:

1. How many years did you spend in livestock farming?years

2. Did you have any agricultural training? Yes No

2.1. If yes, Specify:

3. What is the purpose of this business?

.....

4. Are you a member of any farmer association or other group? Yes No

4.1. If yes, specify:

5. Did you have any loss of your animals over the last 12 months? Yes No

5.1. If yes, specify:

6. Do you cultivate crops?

6.1. If yes, what type?

Crop	Superficies (ha)
Maize	
Millet	
Wheat	
Vegetables	
Fruits	
Others	

7. Which factors influence your choice of crops?

8. Why do you cultivate crops? Self-consumption

For sale

9. Credit:

1. Have you ever-obtained credit? Yes No

1.1. If yes, for what purposes did you get credit?

.....

2. Do you receive any subsidies or support from the government? Yes

No

3. Have you obtained any credits this year?

.....

3.1. If yes, for what activities are you using the credit?

.....

4. What are the major problems you face to pay the credit?

6. Production and sale:

6. a. Production:

1. How many livestock have you produced in the last 12 months?

Type of animal	Number
Cattle	
Sheep	
Goat	
Others	
Milk (L)	

2. How many animals did you sell?

Type of animal	Number sold	Price/ Unit
Cattle		
Sheep		
Goat		
Others		
Milk (L)		

3. Do you have any obstacle to sell the production?

.....

3.1. How far is the nearest marketKm

3.2. How far is the furthest market.....Km

4. Do you have problem to get transport? Yes No

5. What is the transport cost of your production? R.....

6. What is the cost for?

Truck rental: R..... Labour for loading/unloading: R..... Other fees: R.....

6. b. Income:

1. What was your profit from the sale of your production in the last 12 months?

Livestock	Number	Income
Cattle		
Sheep		
Goat		
Others		
Milk(L)		

6. c. Overheads:

1. How much do you pay for the following overheads?

overheads	amount
Rant	
Electricity & water	
Farm equipment	
Security	
Phones	
Vehicles	
Transport of animals	
Petrol & diesel	
Veterinary services	
Insurance	
Salaries	
Others	

7. Marketing:

1. What are your main sources of market information?
.....

2. What types of information are you unable to get which makes it more difficult to sell the production?

3. Which marketing channel do you prefer to use to sell your livestock?

- a- Abattoirs b- Sell to farmers or private c-Butcheries
d-Auctions e-Self slaughtering and sell meat

f-Others, specify

4. Why do you prefer that kind of marketing channel?

- a- Better price b-Easy to access
c- Sell many animals at once d-others, specify

5. Do you obtain livestock market price information? Yes No

5.1. If yes, from where?

6. Do you use a broker or agency to sell your livestock? Yes No

6.1. If yes, what is the cost? R.....

7. How do you advertise your products?

- a- Electronic media b-By announcing at community gathering
c- Others.....

7.1. What is the cost of advertisement? R.....

7.2. If you do not advertise, why?

8. In your own opinion what can be done to ensure a better market price?
.....

9. How do the big farmers affect market price?

10. Is there any way that the activities could be improved or be more efficient?
.....

11. What are the biggest risks you are facing in buying and selling the production?
.....

12. How do you deal with those risks?

.

13. What can the government do to reduce these risks?

.

14. What are the fundamental factors affecting livestock commercialisation?

.....

15. You are welcome to raise any comment regarding the marketing of livestock

.....

...

16. Do you need feedback concerning my research?

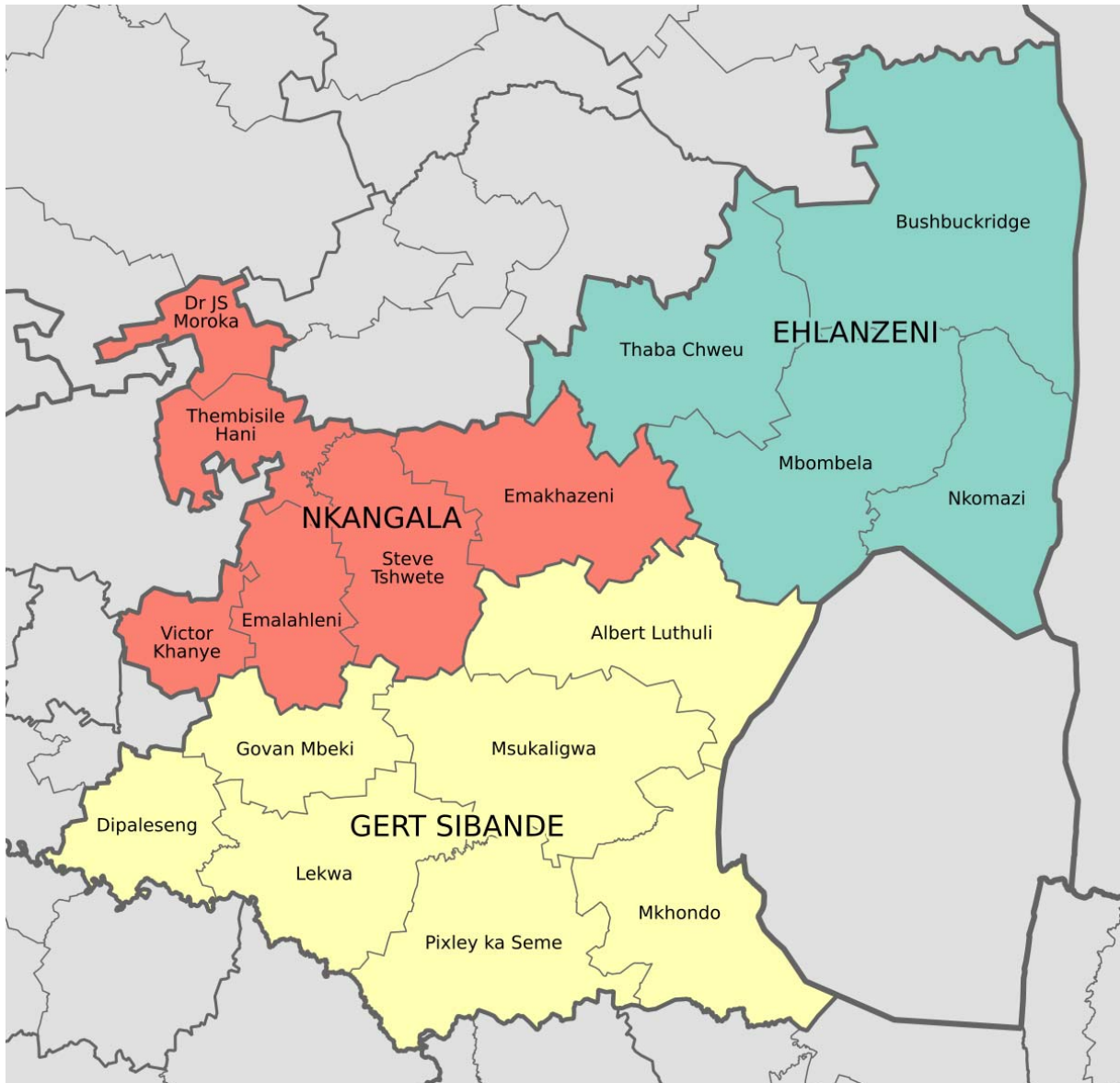
Yes

No

General opinion:

Thank you very much

Appendix 2: Map of Mpumalanga Province



Source: en.wikipedia.org

Appendix 3: Explanatory variables used in the study and their expected signs

Variables description	Variables name	Measurement value	Expected sign
Farmer's Age	age	In years (number)	-
Farmer's Gender	gender	1 for male, 0 for female	+/-
Education1	education1	1if farmer has primary education, 0 otherwise	+
Education2	education2	1if farmer has secondary education,0 other wise	+
Formal Employment	employment	1if formally employed, 0 otherwise	+
Experience	experience	In years(number)	+
Agricultural training	raining	1 if trained, 0 otherwise	+
Organisation membership	organisation	1if farmer is a member of agricultural organisation, 0 otherwise	+/-
Livestock composition	livstockcom	1if only have cattle, 0 otherwise	+/-
Herd size of cattle	herdsizeca	Number of cattle owned	+
Herd size of sheep	herdsizeh	Number of sheep owned	+
Herd size of goat	herdsizego	Number of goat owned	+
Livestock loss	livestockloss	1if has lost animals,0 otherwise	-
Infrastructure	infrastruc	1if infrastructure (roads, holding facilities) is good and 0 otherwise.	+
Crop cultivation	crop	1if cultivate a crop, 0otherwise	-
Credit access	credit	1if have access to credit, 0 otherwise	-
Transport ownership	transport	1 if farmer owns truck (transport owned), 0 otherwise	+/-
Transportation cost	transportcost	In Rand	-

Use of broker or agency to sell	brok	1 if used , 0 otherwise	-
Marketing channel used	markch	1=abattoir, 2=private sale, 3=butcheries, 4=auction, 5=self slaughter and sell meat	+/-
Advertisement	adv	1 if advertise, 0 otherwise	-
Access to market price information	Infoprice	1 if have access to market price information, 0 otherwise	+
Farmer's perception of livestock marketing	Fact	1=drought, 2=market demand, 3=animal condition, 4= infrastructure , 5= training	+/-
municipality	munici	1= Ehlanzeni, 0=gert sibande	+/-

Appendix 4: Consent Form
CONSENT FORM

TITLE OF RESEARCH PROJECT

**FACTORS INFLUENCING MARKET ACCESS AND LIVESTOCK MARKETING
INEFFICIENCY IN MPUMALANGA PROVINCE**

Dear Mr/Mrs/Miss/Ms _____ Date...../...../20...

NATURE AND PURPOSE OF THE STUDY

The study is a research in marketing behaviour of livestock farmers in Mpumalanga province.

The purpose of the study is to identify the factors influencing the sale of livestock and marketing inefficiency in the region; also, it will investigate the existing marketing strategies and will propose improvement options.

RESEARCH PROCESS

1. The study requires your participation in interviews to fill up a questionnaire.
2. The interviews will take place in your production area (farm) or your business place with an appointment will be made in advance.
3. You do not need to prepare anything in advance.
4. Basic demographic information will be required from you such as gender, age, education level and occupation.
5. All your answers will be valued.
6. Participants will be given the opportunity to express their opinion on the subject of the study.
7. Participants will receive feedback if they required for it at the end of the research project in completion.

**NOTIFICATION: PHOTOGRAPHIC MATERIAL, TAPE RECORDINGS, ETC
WILL NOT BE USED IN THIS STUDY.**

CONFIDENTIALITY

Your answers and informations as well as your opinions are viewed as strictly confidential, and only members of the research team will have access to the information. No data published in dissertations and journals will contain any information through which you may be identified. Your anonymity is therefore ensured.

WITHDRAWAL CLAUSE

I understand that I may withdraw from the study at any time. I therefore participate voluntarily until such time as I request otherwise.

POTENTIAL BENEFITS OF THE STUDY

The demand of animal products is increasing and livestock farmers need to gear themselves towards some degree of commercialization. In the light of the purpose of the study Farmers will have the opportunity to evaluate their marketing behaviour. The findings of the study will be useful to develop techniques that improve the existing marketing strategies in different region of the country.

INFORMATION

If I have any questions concerning the study, I may contact the supervisor Prof Oyekale at the department of Agriculture and Animal health, Floride Campus, Unisa. Tel: 018 389 2751.

CONSENT

I, the undersigned, (full name) have read the above information relating to the project and have also heard the verbal version, and declare that I understand it. I have been afforded the opportunity to discuss relevant

aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the university and any employee or student of the university against any liability that I may incur during the course of the project.

I further undertake to make no claim against the university in respect of damages to my person or reputation that may be incurred as a result of the project/trial or through the fault of other participants, unless resulting from negligence on the part of the university, its employees or students.

I have received a signed copy of this consent form.

Signature of participant:

Signed at on

WITNESSES

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